

ADDITIONAL NOTES ON THE GENUS VERBENA. XXIV

Harold N. Moldenke

VERBENA [Dorst.] L.

Additional synonymy: Verbenella Spach, Hist. Nat. Veg. Phan. 9: 237--238. 1840. Glandularia Schau. apud Buek, Gen. Spec. Syn. Candoll. 3: 199. 1858. Verbera Bert. ex Moldenke, Phytologia 36: 47, in syn. 1977.

Additional & emended bibliography: Apul. Barb., Herb., ed. 1. 1480-1483; Anon., Dialogue des Créatures, dial. 30. 1482; Apul. Barb., Herb., ed. 2. 1528; Anon., Bastiment des Receptes, fol. 59 vert. 1544; H. Bock [Tragus], Stirp. Max. Germ. 102, 210, & 211. 1552; Clus., Rar. Stirp. Obser. Hist. 2: 372--373. 1576; Dodoens [l'Ecluse], Hist. Pl. 96 & 97. 1667; P. Herm., Parad. Batav. Prodr. [ed. Warton]. 1689; Dill. in Tay, Synop. Meth. Stirp. Brit., ed. 3, 236. 1724; P. Herm., Mus. Zeyl., ed. 2, 58. 1726; L., Hort. Cliff., imp. 1, 10--11. 1737; Breyn., Prodr. Fasc. Rar. Pl., ed. 2, 2: 100 & 104. 1739; Strand in L., Amoen. Acad. 69: 449. 1756; L., Syst. Nat., ed. 10, imp. 1, 2: 851 (1759) and ed. 10, imp. 2, 2: 851. 1760; Chomel, Abrég. Hist. Pl. Usuel., ed. 6, 1: 143 (1761) and ed. 6, 2 (2): 18, 85--87, & 251. 1761; L., Sp. Pl., ed. 2, 27--29. 1762; Jacq., Obs. Bot. 4: 6--7, pl. 85 & 86. 1771; Ginanni, Istori. Civ. Nat. Pinet. Ravenn. 177. 1774; Chomel, Abrég. Hist. Pl. Usuel., ed. 6 nov., 89, 313, 527, & 637. 1782; Jacq., Select. Stirp. Amer. Hist. 8. 1788; F. Hernandez, Hist. Pl. Nuev. Españ., ed. 1, 1: 139 & 439 (1790) and ed. 1, 3: 3 & 486. 1790; Moebch, Suppl. Meth. Pl. 131 & 150--151. 1802; Chomel, Abrég. Hist. Pl. Usuel., ed. 7, 1: 175 & 495 (1803) and ed. 7, 2: 293 & 488. 1803; Stokes, Bot. Mat. Med. 1: 38--39. 1812; A. Rich., Bot. Méd. 1: 242--243. 1823; Dierbach, Arzneimit. Hippok. 85 & 270. 1824; A. Rich. [transl. G. Kunze], Med. Bot. 1: 381 (1824) and 2: 1302. 1826; Sweet, Hort. Brit., ed. 2, 418--419. 1830; G. Don in Loud., Hort. Brit., ed. 1, 246--247 (1830) and ed. 2, 246--247. 1832; G. Don in Loud., Hort. Brit. Suppl. 1, imp. 1, 602 & 680. 1832; Loud., Hort. Brit., ed. 2, 552, 553, 575, & 602. 1832; A. Dietr., Handb. Pharmaceut. Bot. 114 & 412. 1837; D. Dietr., Taschenb. Arzneigew. Deutschl. 58 & 262. 1838; Baxt. in Lour., Hort. Brit. Suppl. 2: 680. 1839; G. Don. in Loud., Hort. Brit., ed. 3, 246--247. 1839; G. Don in Loud., Hort. Brit. Suppl. 2: 704 & 741. 1839; Loud., Hort. Brit., ed. 3, 575 & 602. 1839; Sweet, Hort. Brit., ed. 3, 768. 1839; Spach, Hist. Nat. Veg. Phan. 9: 227 & 236--241. 1840; Schau. in A. DC., Prodr. 11: 524, 435--557, 614, & 736. 1847; Webb in Hook., Niger Fl. 161. 1849; Baxt. in Loud., Hort. Brit. Suppl. [3]: 655. 1850; G. Don in Loud., Hort. Brit. Suppl. 1, imp. 2, 680 & 733. 1850; Anon., Croniqueur du Périgord 120. 1853; F. Lenormant, Bull. Soc. Bot. France 2: 315--320. 1855; Schnitzlein, Iconogr. Fam. Nat. 2: 137 Verbenac. [2], [3], & 137, fig. 4--22 & 30. 1856; Buek, Gen. Spec. Syn. Candoll.

3: 199, 494--496, & 507. 1858; A. Gray, Proc. Am. Acad. 6: 50. 1862; Paine, Ann. Rep. Univ. N. Y. 18: [Pl. Oneida Co.] 109. 1865; Voss in Vilm., Fl. Pleine Terr., ed. 1, 936--942 (1865) and ed. 2, 2: 973--979. 1866; Symphor Vaudoré, Lettr. Vieux Laboureur 88. 1867; J. Cousin, Secr. Mag. 1868: 7, 37, & 45. 1868; Voss in Vilm., Fl. Pleine Terr., ed. 3, 1: 1197--1203. 1870; Buek, Gen. Spec. Syn. Candoll. 4: 413. 1874; Chenaux, Diable & Ses Cornes 53 & 54. 1876; Anon., Rev. du Tarn 1877: 39. 1877; Franch., Nouv. Arch. Mus. Hist. Nat. Paris, ser. 2, 6: 112 [Pl. David. 1: 232]. 1883; Strobl, Oesterr. Bot. Zeitschr. 33: 406. 1883; Vilm., Fl. Pleine Terr. Suppl. 3: 195. 1884; Balf. f., Bot. Socotra 232 & 437. 1888; Kuntze, Rev. Gen. Pl. 2: 502 & 510. 1891; J. Camus, Récept. France in Bull. Soc. Syndic. Pharmac. Côte-d'Or. 10. 1892; J. Feller, Bull. Folklore 2: 105--109. 1893; Nairne, Flow. Pl. West. India 249. 1894; Voss in Vilm., Fl. Pleine Terr., ed. 4, 1065--1070. 1894; Engl., Syllab. Pflanzenfam., ed. 2, 178. 1898; Van Tieghem, Elem. Bot., ed. 3, 2: 372 & 373. 1898; Bidault, Superst. Méd. Morvan 36. 1899; Diels, Fl. Cent.-China 547. 1902; Engl., Syllab. Pflanzenfam., ed. 3, 187. 1903; Anon., Rev. Tradit. Populaires 1904: 162 (1904) and 1905: 160 & 296. 1905; Druce & Vines, Dill. Herb. 78, 182, & 257. 1907; Engl., Syllab. Pflanzenfam., ed. 5, 192 (1907) and ed. 6, 198. 1909; Gilg in Engl., Syllab. Pflanzenfam., ed. 7, 314, fig. 413 C--F. 1912; Loes., Verh. Bot. Ver. Brand. 53: 74--75. 1912; Bég. & Vacc., Ann. di Bot. 12: 118. 1913; Reynier, Bull. Soc. Bot. France 62 [ser. 4, 15]: 205. 1915; Pamp., Nuov. Giorn. Bot. It., ser. 2, 23: 284. 1916; Skottsbo., Kgl. Svensk. Vet. Akad. Handl. 56 (5): 291--292. 1916; Gilg in Engl., Syllab. Pflanzenfam., ed. 8, 318, fig. 413 C--F. 1919; Pennell, Bull. Torrey Bot. Club 46: 186. 1919; Knoche, Fl. Balearic., imp. 1, 1: 59. 1921; Fedde in Just, Bot. Jahresber. 45 (1): 583. 1923; Sydow in Just, Bot. Jahresber. 45 (1): 402. 1923; Gilg in Engl., Syllab. Pflanzenfam., ed. 9 & 10, 339, fig. 418 C--F. 1924; Robledo, Bot. Med. 267 & 392. 1924; Cavara, Atti Soc. It. Prodr. Sc. 14: 337. 1925; Krause in Just, Bot. Jahresber. 44: 1172, 1195, & 1212. 1926; Pittier, Man. Pl. Usuel. Venez. 395, 398, & 450. 1926; Wangerin in Just, Bot. Jahresber. 46 (1): 717 & 718. 1926; Fedde in Just, Bot. Jahresber. 44: 1534. 1927; Wangerin in Just, Bot. Jahresber. 49 (1): 522. 1928; Fedde in Just, Bot. Jahresber. 46 (2): 712. 1929; Freise, Bol. Agric. São Paulo 34: 480 & 494. 1933; Gunther, Herb. Apul. Barb. [16v], 106, 113, 128, & 129. 1935; E. D. Merr., Trans. Am. Phil. Soc., ser. 2, 24 (2): [Comm. Loud.] 15, 331, & 444. 1935; Diels in Engl., Syllab. Pflanzenfam., ed. 11, 339, fig. 432 C--F. 1936; M. F. Baker, Fla. Wild Fls., ed. 2, imp. 1, 188 & 244. 1938; Rohde, Rose Recipes, imp. 1, 21. 1939; W. Trelease, Pl. Mat. Decorat. Gard. Woody Pl., ed. 5, imp. 1, 144 & 187. 1940; F. Hernandez, Hist. Pl. Nuev. Españ., ed. 2, 653 & 674. 1943; Roi, Atl. Pl. Méd. Chin. [Mus. Heude Not. Bot. Chin. 8:] 96. 1946; A. W. Anderson, How We Got Fls., imp. 1, 90, 168, & 283. 1951; Conard, Pl. Iowa 44. 1951; Hatta, Kubo, & Watanabe, List Med. Pl. 14. 1952; Sonohara, Tawada, & Amano [ed. E. H. Walker], Fl. Okin. 132. 1952; Pételot, Arch. Recherch. Agron. &

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Fleming, Genelle, & Long, Wild Fls. Fla. 15 & 67. 1976; Follman-Schrag, Excerpt. Bot. A.26: 518. 1976; F. R. Fosberg, Rhodora 78: 113. 1976; Galiano & Cabezudo, Lagasalia 6: 150. 1976; Grimé, Bot. Black Am. 186, 190--191, 220, & 230. 1976; J. H. Harv., Journ. Gard. Hist. Soc. 4 (3): 38. 1976; S. R. Hill, Sida 6: 325. 1976; Hurd & Linsley, Smithson. Contrib. Zool. 220: 10. 1976; Keys, Chinese Herbs 283--284 & 387. 1976; Lacoursiere, Pontbriand, & Dumas, Natur. Canad. 103: 174. 1976; Lakela, Long, Fleming, & Genelle, Pl. Tampa Bay, ed. 3 [Bot. Lab. Univ. S. Fla. Contrib. 73:] 115, 116, 168, 178, & 182. 1976; Long & Lakela, Fl. Trop. Fla., ed. 2, 733, 740--742, 940, & 961. 1976; López-Palacios, Revist. Fac. Farm. Univ. Los Andes 17: 49--50. 1976; Lousley, Fl. Surrey 282, map 288. 1976; Moldenke, Phytologia 32: 512 (1976), 33: 374--375, 480, & 512 (1976), and 34: 19--20, 153, 247--252, 254, 256--263, 266--268, 270, 274, 278, 504, & 512. 1976; A. L. Moldenke, Phytologia 35: 173. 1976; A. R. Moldenke, Phytologia 34: 345, 356, & 361. 1976; Norman, Fla. Scient. 39: 30. 1976; Park Seed Co., Park Seeds Fls. & Veg. 1976: 63 & 90. 1976; Soukup, Biota 11: 2, 17--19, & 22. 1976; Van Bruggen, Vasc. Pl. S. Dak. 368--369, 520, 529, 536, & 537. 1976; Vanderpoel, Natl. Wildlife 15 (1): 50. 1976; [Voss], Mich. Bot. 15: 237. 1976; E. H. Walker, Fl. Okin. & South. Ryuk. 882--884, 1976; 279, 504, & 512. 1976; 35: 512 (1977) and 36: 28--31, 33, 35, 36, 39, 40, 42, 47, 48, 51, & 52. 1977; A. L. Moldenke, Phytologia 35: 173 (1977) and 36: 87 & 88. 1977; F. H. Montgomery, Seeds & Fruits 201, fig. 5 & 6, 202, fig. 1--3, & 230. 1977; Taylor & MacBryde, Vasc. Pl. Brit. Col. 436 & 751. 1977.

Swift (1974) tells us that "Verbena is an ancient Latin term for ceremonial foliage rather than a name for a specific class of plants. In post-classical times the name became applied to vervain, probably in connection with medicinal uses". Garcia and his associates (1975) inform us that the vernacular name, "verbena", in Central America is applied also to Browallia americana L. and Salvia occidentalis Sw.

The Fitter work cited in the bibliography above is dated "1974" on the title-page, but was not actually issued until February 17, 1975.

Don (1830) divides the genus into two sections based on leaf characters: Indivisae with undivided leaf-blades, and Trifidae with trifid blades.

The following two taxa described by Sloane (1739) are still puzzling and have not as yet been satisfactorily identified as far as I know:

"VERBENA Americana procumbens, Veronicae aquaticae folio subrotundo, flosculis ad foliorum alas; nobis. Teucrium Americanum procumbens Veronicae aquaticae foliis subrotundis; Hermanni, Catal. Hort."

"VERBENA nodiflora major Indica, flore niveo; nobis. In Horto Fageliano, nomine Teucris & Veronicae, legimus."

Similarly, the following taxon of P. Hermann (1726) is still

unidentified:

"TELKAPALA. Verbena Indica rotundifolia spicis comosis." No such name as "telkapala" is used in Sri Lanka today according to local botanists there now.

Roi (1946) lists a Chinese vernacular name for members of this genus, "ma pien ts'ao" -- probably actually for V. officinalis L. or xV. hybrida Voss. The Commonwealth Mycological Institute (1972) lists the fungus, Ascochyta cuneomaculata, as attacking members of the genus Verbena.

The Endlicher (1838) reference cited in the bibliography of Verbena is often cited as "1836-1856", but the pages involved with this genus were actually issued in 1838. The Sibthorpe & Smith (1809) reference, similarly, is sometimes cited as "1806", but pages 219-442 of the volume involved here were not actually published until 1809.

The genus Verbenella Spach, curiously overlooked by the editors of the "Index Kewensis" and by every previous worker on this group of plants, is based by Spach (1840) on Verbena chamaedryfolia Juss. and would therefore be congeneric with what some present-day botanists regard as the genus Glandularia (1791).

Gibbs (1974) reports verbenalin (cornin), stachyose, and tannin present in Verbena, but L-bornesitol (a cyclitol) and raffinose are absent, while saponins are by some workers reported as probably present, by others as absent or probably absent. Bennett (1974) defines "Verbena oil" or "verbenalin" as $C_{17}H_{25}O_{10}$; m.w. 389.2; wh. need.; m.p. 178; s.w.; sl.s.al.; s. acet.; glucoside. d-verbenone - $C_{10}H_{14}O$; m. w. 150.11; col. oil; sp. gr. 0.997²⁰; m.p. 6.5; b.p. 227; s.w."

From a fancied resemblance, Malva alcea L., a mallow, is often called the "vervain mallow".

An additional excluded species is

Verbena microcephala López-Palacios, Revist. Fac. Farm. Univ. Los Andes 15: 51, sphalm. 1975 = Lantana trifolia f. hirsuta Moldenke

The "verbena" illustrated in color by Moser (1974) is a species of Abronia in the Nyctaginaceae. The M. E. Jones 359, distributed as a Verbena sp., is actually Lantana scorta Moldenke, while M. C. Johnston 2664 and Stuessy 1031 are Priva grandiflora (Ort.) Moldenke and Sohmer 5332 is Salvia occidentalis Sw.

The Degeners and Pekelo (1975) record "hoi" as a Hawaiian name for the genus Verbena, probably for V. litoralis H.B.K.

Andrew R. Moldenke (1976) has found that members of this genus (section Glandularia) in California have "strong mechanical or temporal barriers to inbreeding even though the flowers are genetically self-compatible" and are nearly always very heavily out-crossed, the pollination being especially effected by butterflies, but also by Bombyliidae and probably also by short-tongued groups of insects like many species of Villa, generalist feeding bees in-

cluding many genera in all families and many species of bees whose males may be common generalists even though the females are restricted to one genus of plants, including Bombus, Ceratina, Megachile, Melissodes, and Osmia but not the 'table-scraping' sometimes colonial Halictinae which are usually generalist feeders."

VERBENA ABRAMSI Moldenke

Additional bibliography: Moldenke, Phytologia 28: 344. 1974; Hocking, Excerpt. Bot. A. 26: 5 & 6. 1975.

Additional citations: CALIFORNIA: Trinity Co.: Moldenke & Moldenke 30246 (Ld).

VERBENA ALATA Sweet

Additional synonymy: Verbena allata Hort. ex Moldenke, Phytologia 34: 278, in syn. 1976.

Additional bibliography: Sweet, Hort. Brit., ed. 2, 418--419. 1830; Loud., Hort. Brit., ed. 2, 552 & 602 (1832) and ed. 3, 602. 1839; Baxt. in Loud., Hort. Brit. Suppl. [3]: 655. 1850; Buek, Gen. Spec. Syn. Candoll. 3: 494. 1858; Moldenke, Phytologia 28: 344 (1974) and 34: 278. 1976.

Ferreira describes this plant as a subshrub and found in it flower and fruit in July. The corolla color of Ferreira 174 is said to have been "lilac", while on Hatschbach 17252 it was "violet".

The Lindeman & Haas 3010, distributed as V. alata, is actually V. minutiflora Briq.

Additional citations: BRAZIL: Minas Gerais: Widgren s.n. [1845] (Mu--1570). Paraná: L. F. Ferreira 174 (Ld); Hatschbach 17252 (Ld). CULTIVATED: France: Weinkauff s.n. [hort. Paris. 1834] (Mu--1239). Germany: Herb. Schwaegrichen s.n. [Hort. Linsiensis] (Mu--1238); Herb. Zuccarini s.n. [hort. Berol. 1827] (Mu--281).

VERBENA ALBICANS Rojas

Additional & emended bibliography: Krapovickas, Bol. Soc. Argent. Bot. 11, Supl. 261. 1970; Moldenke, Phytologia 30: 132 (1975) and 31: 388. 1975.

VERBENA ALBIFLORA Rojas

Additional & emended bibliography: Krapovickas, Bol. Soc. Argent. Bot. 11, Supl. 269. 1970; Moldenke, Phytologia 30: 132 (1975) and 31: 388. 1975.

xVERBENA ALLENI Moldenke, Phytologia 34: 153. 1976.

Bibliography: Moldenke, Phytologia 34: 153, 250, & 279. 1976.

This plant has been found growing in black calcareous soil and scattered on roadsides with Cynodon dactylon, Helenium amarum, Vernonia altissima, and Xanthium strumarium, in and after anthesis in September. The plants are described as 3--4 feet tall and the

corollas (on Montz 2485) said to have been blue when fresh. Herbarium material has hitherto been misidentified as V. neomexicana (A. Gray) Small and as V. xutha Lehm. The cited specimens exhibit many, slender, flexible spikes, some to as much as 45 cm. long, and apparently with all or almost all of the seeds aborted.

Citations: LOUISIANA: LaSalle Par.: C. A. Brown 7409 (Lv). Pointe Coupee Par.: Montz 2485 (Lv). Saint Helena Par.: C. M. Allen 1179 (Lv--type).

VERBENA AMBROSIFOLIA Rydb.

Additional bibliography: Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl., imp. 1, 716. 1969; G. W. Thomas, Tex. Pl. Ecolog. Summ. 77. 1969; Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl., imp. 2, 716. 1974; Moldenke, Phytologia 30: 132--133, 139, & 179. 1975; A. L. Moldenke, Phytologia 35: 173. 1977.

Higgins found this plant growing in gravelly to sandy soil in pinyon-juniper association areas, while Atwood encountered it in "pinyon-juniper-sage-ponderosa community" and distributed his collection as V. bracteata Lag. & Rodr. Reitzel found it growing in "clumps 6--7.5 dm. across, 3 dm. tall, at 7700 feet altitude with Ipomopsis, Rosa, Quercus, Pinus edulis, a few P. ponderosa, Juniperus, Mirabilis, Sphaeralcea, and Bromus". Dziekanowski and his associates report it very scattered in pinyon-juniper woodland with grassy areas of gramma grass and staghorn cactus.

Other recent collectors have encountered V. ambrosifolia in rocky washes, "scattered on open sandy-clay flats with Ephedra, Eriogonum, Lycium, Mentzelia, Psilostrophe, Yucca, etc." and "in matorral desértico inermis on alluvial flats in fine calcareous alluvium with Prosopis glandulosa, Larrea, and Flourensia cernua".

The corollas on Henrickson 5858 are said to have been "light-purple" when fresh, while those on Correll & Johnston 19136 were "magenta" and those on Reitzel 27 were "pink".

The G. L. Fisher s.n. [Nara Visa, Apr. 21, 1911], distributed as V. ambrosifolia, actually is V. ciliata var. pubera (Greene) Perry, while Meebold 24224 is V. wrightii A. Gray. The Ramirez & Cardenas 13, previously cited as V. ambrosifolia by me in this series of notes, apparently is a mixture -- the University of Texas sheet of this number definitely is V. ciliata var. longidentata Perry. The Spellenberg & Spellenberg 3062 cited by me in 1974 actually is V. gooddingii var. nepetifolia Tidestr.

Additional citations: TEXAS: Culberson Co.: Correll & Johnston 19136 (N). NEW MEXICO: Eddy Co.: Higgins 9197 (N). Harding Co.: S. Stephens 75643 (N). Otero Co.: Reitzel 27 (N). Rio Arriba Co.: Atwood 6298 (N). Torrence Co.: Dziekanowski, Dunn, & Bennett 2393 (N). MEXICO: Chihuahua: Henrickson 5858 (Ld). Nuevo León: Johnston, Wendt, & Chiang C. 10212 (Id). Tamaulipas: Kuiper & Kuiper-Lapré M.17 (Ut--328636B).

VERBENA AMBROSIFOLIA f. EGLANDULOSA Perry

Additional bibliography: Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl., imp. 1, 716 (1969) and imp. 2, 716. 1974; Moldenke, Phytologia 30: 132--133 & 139. 1975.

Howe found this plant in flower and fruit in October.

The R. Runyon 1782, distributed as this form and so cited by me in previous publications actually is V. ciliata var. longidentata Perry.

Additional citations: ARIZONA: Coconino Co.: D. Howe s.n. [1 October 1968] (Sd—69988).

VERBENA AMOENA Paxt.

Additional bibliography: Baxt. in Loud., Hort. Brit. Suppl. [3]: 655. 1850; Moldenke, Phytologia 28: 111 (1974) and 34: 252. 1976.

Gentry & Arguelles found what appears to be this species growing along roadsides at 7700 feet altitude, flowering and fruiting in June, and describe the plant as forming large compact clumps, with secondary rooting at the stem-bases and with showy purple flowers.

Additional citations: MEXICO: Chihuahua: Gentry & Arguelles 22955 (Sd—86465).

VERBENA ANDRIEUXII Schau.

Additional synonymy: Verbena andrieuxii DC. ex Moldenke, Phytologia 34: 278, in syn. 1976.

Additional bibliography: Buek, Gen. Spec. Syn. Candoll. 3: 494. 1858; Moldenke, Phytologia 23: 214 (1972) and 34: 278. 1976.

Material of this species has been misidentified and distributed in some herbaria as V. aubletia Jacq.

Additional citations: MEXICO: Puebla: Andrieux 138 (Mu—2477— isotype). CULTIVATED: Germany: Herb. Bot. Staatssamml. Münch. s. n. (Mu); Herb. Hort. Monac. s.n. (Mu).

VERBENA ARAUCANA R. A. Phil.

Additional bibliography: Moldenke, Phytologia 23: 182 (1972), 31: 387 (1975), and 34: 260. 1976.

Merxmüller found this plant in flower in December, while Schajovskoy encountered it at 1300 meters altitude.

Additional citations: CHILE: Malleco: Merxmüller 24966 (Mu). ARGENTINA: Neuquen: Schajovskoy s.n. [16.I.1967] (Mu).

VERBENA ARISTIGERA S. Moore

Additional bibliography: Moldenke, Phytologia 30: 133 & 173. 1975.

Recent collectors describe this plant as decumbent and have found it in flower in October and November. The corollas are said to have been "purple" on Krapovickas & al. 26800 and on Schinini & Cristóbal 9864.

The Hatschbach 23884, previously cited by me as V. aristigera,

is perhaps better regarded as representing V. tenuisecta Briq.

Additional citations: ARGENTINA: Corrientes: Krapovickas, Cristóbal, Irigoyen, & Schinini 26800 (Ld); Schinini & Cristóbal 9864 (Ld). Entre Ríos: Lorentz 478 (Mu--1565).

VERBENA ATACAMENSIS Reiche

Additional bibliography: Moldenke, *Phytologia* 28: 344--345 & 441. 1974.

Zöllner encountered this plant growing near the seacoast.

Additional citations: CHILE: Antofagasta: Werdermann 789 (Mu); Zöllner 8310 (Ac). Atacama: Zöllner 9080 (Ld)

VERBENA AURANTIACA Speg.

Additional synonymy: Glandularia aurantiaca Speg. ex Moldenke, *Phytologia* 34: 274, in syn. 1976.

Additional bibliography: Moldenke, *Phytologia* 23: 214 (1972) and 34: 274. 1976.

Additional citations: ARGENTINA: Chubut: Kreitbohm 117 (Mu).

xVERBENA BAILEYANA Moldenke

Additional bibliography: Moldenke, *Phytologia* 28: 345 & 401 (1974) and 34: 270. 1976.

The Herb. Zuccarini specimens cited below are both mixtures with V. officinalis L. and were originally identified and distributed as V. hastata L. and V. scabra Vahl.

Additional citations: CULTIVATED: Germany: Herb. Zuccarini s. n. [Hort. bot. Monac.], in part (Mu, Mu).

VERBENA BAJACALIFORNICA Moldenke

Additional bibliography: Moldenke, *Phytologia* 23: 214. 1972.

Moran & Reveal refer to this plant as "fairly common" at 300 meters altitude and found it in flower in February. The corollas on their no. 20047 are said to have been "lavender" when fresh.

Additional citations: MEXICO: Baja California: Moran & Reveal 20047 (W--2796936).

VERBENA BALANSAE Briq.

Additional bibliography: Moldenke, *Phytologia* 28: 345 (1974) and 36: 35. 1977.

Krapovickas and his associates describe this plant as "decumbent", the corollas "violet" in color. Hatschbach refers to it as being xylopodiferous, with lilac (on 37118) or whitish (on 38688) flowers, and found it growing on "campo brejoso de solo vermelho" and "campo limpo", in flower in May.

Additional citations: BRAZIL: Mato Grosso: Hatschbach 38688 (Ld). Paraná: Hatschbach 37118 (Ld). ARGENTINA: Corrientes: Krapovickas, Cristóbal, Schinini, Arbo, Quarín, & González 26144 (Ld).

VERBENA BARBATA Grah.

Additional bibliography: Loud., Hort. Brit., ed. 2, 552. 1832; Baxt. in Loud., Hort. Brit. Suppl. [3]: 655. 1850; Buek, Gen. Spec. Syn. Candoll. 3: 494. 1858; Moldenke, Phytologia 28: 112. 1974.

VERBENA BERTERII (Meisn.) Schau.

Additional bibliography: Buek, Gen. Spec. Syn. Candoll. 3: 494. 1858; Moldenke & Neff, Orig. & Struct. Ecosyst. Tech. Rep. 74-18: 40, 51, & 101. 1974; Moldenke, Phytologia 30: 133 (1975) and 31: 409. 1975; Soukup, Biota 11: 18. 1976.

Additional citations: CHILE: Concepción: Dessauer s.n. [Concepción, Feb. 1870] (Mu--1546); Merxmüller 24804 (Mu). Maule: Dessauer s.n. [Banos de Cauquenes, Oct. 1875] (Mu--1547), Province undetermined: Dessauer s.n. (Mu); Frömbling s.n. [Chili, 1886] (Mu--1776).

VERBENA BERTERII f. ALBIFLORA Moldenke

Additional bibliography: Moldenke, Phytologia 23: 215. 1972; Soukup, Biota 11: 18. 1976.

VERBENA BIPINNATIFIDA Nutt.

Additional synonymy: Verbena bipinnatifida var. bipinnatifida [Nutt.] ex Thomas, Tex. Pl. Ecol. Summ. 77. 1969. V. bipinnatifida var. bipinnatifida Thomas ex Moldenke, Phytologia 34: 278, in syn. 1976

Additional & emended bibliography: Buek, Gen. Spec. Syn. Candoll. 3: 199 & 494. 1858; Loes., Verh. Bot. Ver. Brand. 53: 75. 1912; Tharp, Mycologia 9: 120. 1917; Fedde in Just, Bot. Jahresber. 45 (1): 583. 1923; Sydow in Just, Bot. Jahresber. 45 (1): 402. 1923; Barker, Univ. Kans. Sci. Bull. 48: 571. 1969; Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl., imp. 1, 716. 1969; G. W. Thomas, Tex. Pl. Ecol. Summ. 77. 1969; Fong, Trojánkova, Trojánek, & Farnsworth, Lloydia 35: 147. 1972; Bolkh., Grif, Matvej., & Zakhar., Chrom. Num. Flow. Pl., imp. 2, 176. 1974; El-Gazzar, Egypt. Journ. Bot. 17: 75 & 78. 1974; Stark, Am. Horticulturist 53 (5): 7. 1974; Hinton & Rzedowski, Anal. Esc. Nac. Cienc. Biol. 21: 111. 1975; Kooiman, Act. Bot. Neerl. 24: 463. 1975; Moldenke, Phytologia 30: 133--134, 172, & 179 (1975), 31: 377 & 409 (1975), and 34: 249, 250, 270, & 278. 1976; Park Seed Co., Park Seeds Fls. & Veg. 1976: 90. 1976; Van Bruggen, Vasc. Pl. S. Dak. 368 & 536. 1976; Moldenke, Phytologia 36: 29. 1977.

Additional illustrations: Park Seed Co., Park Seeds Fls. & Veg. 1976: 90 (in color). 1976.

Recent collectors have encountered this species in sandy soil, on periodically mowed roadsides, on chalk cliffs, on clay hills, and in open dry fields, on mesquite flats with Opuntia chlorotica, O. acanthocarpa, and Yucca elata, in creosotebush-Atriplex scrubland, and in heavy soil of meadows. Charette refers to it as "very common in roadside depressions in fields" and Brown calls it "common" in LaSalle Parish, Louisiana. Wright found it "in a

field densely populated with other species of flowers and grasses! Barker (1969) refers to it as "Occasional, in rocky upland prairies, along roadsides and railway right-of-ways" in Kansas, where Gates (1940) reports it from Cowley, Geary, Pottawatomie, Riley, and Wabaunsee counties.

The corollas are said to have been "purple" on Semple & Love 482, "reddish-violet" on Davidse & Davidse 10050, "maroon-pink" on Bisby G.65, and "lavender" on D. S. Correll 16247 and Schulz & Schulz 1336. Correll reports the species as "scattered infrequently". The Schultzes describe the calyx as twice as long as the fruit [seed] "and constricted above it". Stark (1974) states that the species is found usually in "open, but fine textured soils" with a preferred pH value of 6.0--7.0.

Material of this species has been misidentified and distributed in some herbaria as V. drummondii Baxt, and as V. erinoides Lam. On the other hand, the Reeves R. 1075, distributed as V. bipinnatifida, is actually var. latilobata Perry, Garland 200 and Meebold 22681 & 25248 are V. canadensis (L.) Britton, Pringle 7591 is V. elegans H.B.K., Lindheimer s.n. [Galveston, May 1843] is V. halei Small, Bougere 2235, Hester 442 & 517, Ryscroft 2574 & 2626, and Webster & Wilbur 3282 are V. tenuisecta Briq., and Bougere 1996 is V. tenuisecta var. alba Moldenke, while Higgins 8884 and Higgins, Higgins, & Higgins 9849 are V. wrightii A. Gray. Meebold 27286 is a mixture with Evolvulus sp.

Additional citations: ALABAMA: Pickens Co.: R. Kral 26422 (Lc). KANSAS: Leavenworth Co.: J. A. Churchill s.n. [14 May 1954] (Ln--230257). MISSOURI: County undetermined: Herb. Reg. Monac. 4248 (Mu). ARKANSAS: Little River Co.: Demaree 69436 (Ld). LOUISIANA: LaSalle Par.: C. A. Brown 7405 (Lv). OKLAHOMA: Beckham Co.: Clark 14280 (N). TEXAS: Bexar Co.: Meebold 27286, in part (Mu). Brazos Co.: D. Wright 23 (N). Caldwell Co.: W. M. Jones WMJ.203 (Mu), WMJ.252 (Mu). Callahan Co.: Mahler 4976 (Ln--236414). Comal Co.: Charette 820 (Mu); Lindheimer 1072 (Mu--4082), 1073 (Mu--4083). Cooke Co.: Semple & Love 482 (W--2732740). Dallas Co.: D. S. Correll 17247 (Sd--73852); J. Reverchon s.n. [Curtiss 1962*] (Mu--1548). Tarrant Co.: Bisby G.65 (Ac). Taylor Co.: S. M. Tracy 8000 (Ln--70115). County undetermined: Lindheimer III.289 (Mu--271); Torrey & Gray s.n. (Mu--270). NEW MEXICO: Luna Co.: Shultz & Shultz 1336 (N). ARIZONA: Yavapai Co.: Reeves & Pinkava 11933 (N). MEXICO: Chihuahua: Davidse & Davidse 10050 (Ld); McCabe 2 (Ws). CULTIVATED: Sweden: Collector undetermined s.n. [H. L. 1840] (Ac).

VERBENA BIPINNATIFIDA var. LATILOBATA Perry

Emended synonymy: Verbena bipinnatifida var. latiloba Perry ex Moldenke, Alph. List Invalid Names Suppl. 1: 22, in syn. 1947; Hinton & Rzedowski, Anal. Esc. Nac. Cienc. Biol. 21: 111. 1975.

Additional bibliography: G. W. Thomas, *Tex. Pl. Ecolog. Summ.* 77. 1969; Moldenke, *Phytologia* 28: 114. 1974; Hinton & Rzedowski, *Anal. Esc. Nac. Cienc. Biol.* 21: 111. 1975.

Recent collectors have encountered this plant at 9100 feet altitude in Arizona.

Additional citations: ARIZONA: Cochise Co.: W. W. Jones s.n. [8 August 1967] (Sd--72884). Graham Co.: Williams & Williams 3650 (Z). Santa Cruz Co.: Reeves R.1075 (N).

xVERBENA BLANCHARDI Moldenke

Additional bibliography: Moldenke, *Phytologia* 28: 114 & 386. 1974.

Additional citations: ILLINOIS: Winnebago Co.: M. S. Bebb s.n. [Fountaindale] (Mu--4249).

VERBENA BONARIENSIS L.

Additional & emended synonymy: Verbena bonariensis altissima, Lavandulae canariensis spica multiplici Dill. in Ray, *Synop. Meth. Stirp. Brit.*, ed. 3, pl. 300, fig. 387. 1724. Verbena bonariensis Willd. ex Druce & Vines, *Dill. Herb.* 182, in syn. 1907. Verbena bornariensis L. ex Moldenke, *Phytologia* 36: 47, in syn. 1977.

Additional & emended bibliography: Dill. in Ray, *Synop. Meth. Stirp. Brit.*, ed. 3, pl. 300, fig. 387. 1724; L., *Hort. Cliff.*, imp. 1, 11. 1737; L., *Sp. Pl.*, ed. 2, 28. 1762; G. Don in Loud., *Hort. Brit.*, ed. 1, 246 (1830) and ed. 2, 246. 1832; Loud., *Hort. Brit.*, ed. 2, 552. 1832; G. Don in Loud., *Hort. Brit.*, ed. 3, 246. 1839; Buek, *Gen. Spec. Syn. Candoll.* 3: 494 & 495. 1858; Kuntze, *Rev. Gen. Pl.* 2: 510. 1891; Druce & Vines, *Dill. Herb.* 182. 1907; Krause in Just, *Bot. Jahresber.* 44: 1195. 1926; Fedde in Just, *Bot. Jahresber.* 44: 1534. 1927; M. F. Baker, *Fla. Wild Fls.*, ed. 2, imp. 1, 188. 1938; L., *Hort. Cliff.*, imp. 2, 11. 1968; Bolkh., Grif, Matvej., & Zakhar., *Chrom. Numb. Flow. Pl.*, imp. 1, 716. 1969; G. W. Thomas, *Tex. Pl. Ecolog. Summ.* 77. 1969; R. E. Harrison, *Handb. Bulbs & Peren. S. Hemisph.*, ed. 3, 266. 1971; Fong, Trojánkova, Trojánek, & Farnsworth, *Lloydia* 35: 147. 1972; Bolkh., Grif, Matvej., & Zakhar., *Chrom. Numb. Flow. Pl.*, imp. 2, 716. 1974; El-Gazzar, *Egypt. Journ. Bot.* 17: 75 & 78. 1974; R. D. Gibbs, *Chemotax. Flow. Pl.* 3: 1752--1755 (1974) and 4: 2295. 1974; R. W. Long, *Fla. Scient.* 37: 37. 1974; D. S. & H. B. Correll, *Aquat. & Wetland Pl. SW. U. S.*, imp. 2, 2: 1396, 1397, & 1775. 1975; Kooiman, *Act. Not. Neerl.* 24: 463. 1975; Moldenke, *Phytologia* 30: 134--135, 152, & 167 (1975), 31: 375, 377, 389, & 409 (1975), 33: 374 (1976), and 34: 248, 250, 252, 259, 260, & 278. 1976; M. F. Baker, *Fla. Wild Fls.*, ed. 2, imp. 2, 188. 1976; S. R. Hill, *Sida* 6: 325. 1976; Long & Lakela, *Fl. Trop. Fla.*, ed. 2, 741--742 & 961. 1976; Soukup, *Biota* 11: 18. 1976; E. H. Walker, *Fl. Okin. & South. Ryuk.* 883 & 884. 1976; Moldenke, *Phytologia* 36: 28, 39, & 47. 1977.

Additional illustrations: Dill. in Ray, *Synop. Meth. Stirp. Brit.*, ed. 3, pl. 300, fig. 387. 1724.

The Dillen pre-Linnean designation for this species is based

on a specimen grown in the Eltham Garden from seed sent from Buenos Aires, Argentina, by Milam in 1726, according to Druce & Vines (1907), but how this can be possible when Dillen already published the designation in 1724 is not clear to me. The Eltham specimen in the Dillen herbarium was at first identified as V. bonariensis "Willd." by Klinsmann.

Recent collectors describe this plant as a large or "giant" herb, 1.3—2.5 m. tall, the stems stiff, square, with pronounced angles and concave sides, hairy, pale- or dark-green, often maroon-tinged, the leaves "sandpapery" rough, "parchmentaceous-membranous" or "thickly velvety-herbaceous", glossy dark-green above, with pale slightly sunken veins, dull light- or gray-green beneath with prominent veins, the peduncles reddish, the small flowers in spikes, the calyx green at the base, with purple or purplish tips, the corolla hairy outside, and the infructescence gray-green.

Goldsmith found V. bonariensis in scattered patches in open grassland in Rhodesia; Bos refers to it as "abundant" in the Transvaal and "locally dominant" in the Cape Province of South Africa; Moll calls it a "locally fairly common annual herb" in Natal; Scheepers says of it "locally frequent at water's edge and environs, [in] well lit but dense vegetation, widespread as ruderal, especially in moist open spots" in the Transvaal.

Other recent collectors have encountered the species at the edge of open fields in about 50 percent shade, in rather dry soil of old fields, and among Baccharis on "spoil banks". Montz reports it "abundant along railroad 'spoils'" in Louisiana, where Arceneaux asserts that it is "a very common weed along roads, ditches, etc." and Hester says it is "plentiful everywhere". Brown comments that there are "no appendages on anthers" (which is to be expected, since the species is not a member of the Section Glandularia). Wilbur reports it "common along edge of ditch between road and cornfield" in North Carolina.

Walker (1976) cites Amano 7373, Hatusima 17571, and Walker 8133 from Okinawa and records the vernacular name, "tachi-ba-bena", which he explains as "Tachi, erect, ba, leaf, bena, meaning unknown". Arenas encountered the species at the edges of an arroyo and comments that it "crece en yuyal".

The corollas are described as having been "lilac" in color when fresh on Ferreira 163, "blue" on Scheepers 93, "violet" on Arenas 949 and Cabrera 12446, "violet-blue" on Bos 1262, "purple" on O. B. Miller 5184, Moll 745, Sowell s.n., and Wilbur 3947, "rose" on Carauta 686, "purple-mauve" on Goldsmith 71/62, and with "tube purple, lobes lilac" on Bos 142.

Don (1830) called the species "Buenos Ayres vervain" and dates its introduction into English gardens as 1732. Thomas (1969) calls it the "pretty verbena", while Claycomb asserts that in Louisiana it is known as "blue vervain". Carauta records "pai-joaquim" from Rio de Janeiro. In Pahang, Malaya, it is said to be a "roadside weed" in waste places and has been collected in fruit in November.

The Herb. Mus. Bot. Landishuth s.n., cited below, has all its

leaves very narrow-oblong and bears very close resemblance to V. inamoena Briq. DeWinter 7176 is a voucher for chemical studies conducted on the species by Dr. P. R. Enslin. The Univ. Calif. Acc. No. 63.740-83, cultivated in California, was grown there from seeds collected in Teneriffe, Canary Islands. Fabris & Marchionni 2392 is a mixture with V. litoralis H.B.K.

Gibbs (1974) reports cyanogenesis and leucoanthocyanin absent from the leaves of this species and syringin absent from the stems.

Material of V. bonariensis has been misidentified and distributed in some herbaria under the designations V. bonariensis Hook. and V. littoralis Kunth, and even as "Labiatae sp.", while T. Rojas 10077 was originally identified as "V. bonariensis L. f. transiens in V. inamoenam Briq.". On the other hand, the Claycomb s.n. [June 13, 1942], Demaree 15103, Keiser 91, D. K. Lowe 31, J. A. Moore 5200, Robinette 239, and R. R. Smith 1732, distributed as V. bonariensis, actually are V. brasiliensis Vell., while Schlieben 7691 is V. litoralis H.B.K., Arceneaux 35a, Beck 453, and Horst JWH.B.281 are V. rigida Spreng., and Bayliss BS. 7344 is V. temisecta Briq.

Additional citations: NORTH CAROLINA: Robeson Co.: Moldenke & Moldenke 29992 (Ac), 29994 (Gz, Ld, Tu). Tyrrell Co.: Wilbur 3947 (Mi). SOUTH CAROLINA: Charleston Co.: Curtiss 1963** (Mu—1550). GEORGIA: Spalding Co.: Sowell s.n. [4 August 1967] (Lv). FLORIDA: Polk Co.: Moldenke & Moldenke 29529 (Ac, Gz, Ld, Tu). Putnam Co.: Moldenke & Moldenke 29839 (Ld). LOUISIANA: Cameron Par.: Spindler s.n. [30 Sept. 1973] (Lv). Iberia Par.: Hester 650 (Lv). Jefferson Par.: C. A. Brown 2049 (Lv). Lafayette Par.: Claycomb s.n. [July 6, 1942] (Lv). Livingston Par.: Montz 1824 (Lv). Ouachita Par.: R. D. Thomas & Bot. Class 18637 (Lc). Pointe Coupee Par.: M. Chaney 213 (Lv). Saint Mary Par.: Montz 2289 (Lv). Saint Tammany Par.: Arsène 12534 (Lv). Tangipahoa Par.: Correll & Correll 9259 (Lv). Terrebonne Par.: Arceneaux 35a (Lv); Wurzlow s.n. [May 29, 1944] (Lv). Vermilion Par.: Hester 693 (Lv). TEXAS: Orange Co.: J. A. Churchill s.n. [1 May 1955] (Ln—204155). MEXICO: Federal District: Karwinski s.n. [Chapultepec, Aug. 1827] (Mu—279, Mu—280). State undetermined: Prince Paul of Würtemberg s.n. [1830] (Mu—1549). BRAZIL: Paraná: L. F. Ferreira 163 (Ld). Rio de Janeiro: Carauta 686 [Herb. FEE-MA 6811] (Ld). PARAGUAY: T. Rojas 10077 (Mu). URUGUAY: Herter 268 [Herb. Herter 81709] (Mu). CHILE: Arauca: Grau s.n. [31.3. 1968] (Mu). Concepción: Dessauer s.n. [Concepción, Feb. 1870] (Mu—1551). Valdivia: Buchtien s.n. [Valdivia, 7/11/1902] (Mu—3996); Lechler s.n. [Valdivia] (Mu—1568). State undetermined: Leyboldt s.n. [3/1/1860] (Mu—1569). ARGENTINA: Buenos Aires: Cabrera & Fabris 21 (Mu); Herb. Univ. Ludov. Maximil. s.n. (Mu—

277). Corrientes: Arenas 949 (Ld). Entre Rios: Cabrera 12446 (Mu). San Juan: Fabris & Marchionni 2392, in part (Mu). RHODESIA: Fries, Norlindh, & Weimarck 4003 (Mu); Goldsmith 71/62 (Mu). SWAZILAND: O. B. Miller 5184 (Mu). SOUTH AFRICA: Cape Province: Bos 142 (Mu); Ecklon 85 (Mu--285); Penther 1795 (Mu--4085). Natal: Moll 745 (Mu). Transvaal: Bos 1262 (Mu); DeWinter 7176 (Mu); Meebold 12837 (Mu); Scheepers 93 (Mu); Schlieben 7176 (Mu). MASCARENE ISLANDS: Mauritius: Sieber Fl. Maurit. 86 (Mu--286). INDIA: Khasi States: Hooker & Thomson s.n. [Mont. Khasia 1-3000 ped.] (Mu--288). State undetermined: Griffith s.n. [India orientali] (Mu--287). MALAYA: Pahang: Poore 505 (Kl--505); B. C. Stone 5619 (Kl--5220), 7236 (Kl--7747). FIJI ISLANDS: Viti Levu: Meebold 16522 (Mu). AUSTRALIA: New South Wales: Lohm s.n. [Sydney, 28.III.10] (Mu--9138); Meebold 2749 (Mu). GREAT BARRIER REEF: Stradbroke: M. S. Clemens 44242 (Mi). CULTIVATED: California: Univ. Calif. Acc. No. 63.740-83 (Mu). France: Weinkauff s.n. [Jard. des Plant. 1834] (Mu--1243). Germany: Herb. Mus. Bot. Landishuth s.n. (Mu--278); Herb. Schmiedel s.n. (Mu--272, Mu--273); Herb. Schreber s.n. (Mu--275, Mu--276); Herb. Schwaegrichen s.n. (Mu--1244); Herb. Zuccarini s.n. [Hort. bot. Monac. 1832] (Mu--282), s.n. [Hort. bot. Monac. 1887] (Mu--283); Schreber s.n. [hort. bot. Erlang. 1772] (Mu--274). India: Herb. Hort. Bot. Calcutt. s.n. (Mu--289). Sweden: Collector undetermined s.n. [H. L. 1812] (Ac); Zetterstedt s.n. [H. L., 10 Sept. 1838] (Ac).

VERBENA BONARIENSIS var. CONGLOMERATA Briq.

Additional bibliography: Moldenke, Phytologia 28: 346 & 380. 1974.

Borrmüller encountered this plant at 500 meters altitude. Lindeman & Haas describe it as an herb, growing on grassy roadsides, and the corollas on their no. 3902 are said to have been "deep purple-blue" when fresh; the corollas were "purple" on Schinini & Carnevali 10689.

Additional citations: BRAZIL: Rio Grande do Sul: Borrmüller 255 (Mu--4286); Lindeman & Haas 3902 (Ut--320412); Reineck & Czermak 69 (Mu--3793). ARGENTINA: Corrientes: Ibarrola 2053 (Ut--330563B), 2131 (Ut--330573B). Misiones: Schinini & Carnevali 10689 (Ld). CULTIVATED: California: Moldenke & Moldenke 30295 (Ac, Gz, Ld, Mu, Tu, W).

VERBENA BONARIENSIS var. HISPIDA Moldenke, Phytologia 33: 374--375. 1976.

Bibliography: Moldenke, Phytologia 33: 374--375 (1976) and 34: 259. 1976.

Citations: BRAZIL: Rio Grande do Sul: Borrmüller 647 (Mu--4302--type, Z--photo of type).

VERBENA BRACTEATA Lag. & Rodr.

Additional synonymy: Verbena bracteata (Michx.) Lag. & Rodr. ex Perkins, Estes, & Thorp, Bull. Torrey Bot. Club 102: 194, sphalm. 1975.

Additional & emended bibliography: G. Don in Loud., Hort. Brit., ed. 1, 247 (1830) and ed. 2, 247. 1832; Loud., Hort. Brit., ed. 2, 552. 1832; G. Don in Loud., Hort. Brit., ed. 3, 247. 1839; Buek, Gen. Spec. Syn. Candoll. 3: 494, 496, & 507. 1858; Kuntze, Rev. Gen. Pl. 2: 510. 1891; Krause in Just, Bot. Jahresber. 44: 1212. 1926; Fedde in Just, Bot. Jahresber. 44: 1534. 1927; Conard, Pl. Iowa 44. 1951; R. A. Davidson, State Univ. Iowa Stud. Nat. Hist. 20 (2): 77. 1959; Hall & Thompson, Cranbrook Inst. Sci. Bull. 39: 74. 1959; Barker, Univ. Kans. Sci. Bull. 48: 571. 1969; Cooperrider, State Univ. Iowa Stud. Nat. Hist. 20 (5): 70. 1962; Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl., imp. 1, 716 & 717. 1969; G. W. Thomas, Tex Pl. Ecolog. Summ. 77. 1969; Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl., imp. 2, 716 & 717. 1974; Welsh, Utah Pl., ed. 3, 354 & 473, 1974; [Bard], Bull. Torrey Bot. Club 102: 431. 1975; D. S. & H. B. Correll, Aquat. & Wetland Pl. SW. U. S., imp. 2, 2: 1397, 1400, & 1775. 1975; E. H. Jordan, Checklist Organ Pipe Cact. Natl. Mon. 7. 1975; Kooiman, Act. Bot. Neerl. 24: 463. 1975; Moldenke, Phytologia 30: 135-136 (1975) and 31: 376, 377, & 415. 1975; Perkins, Estes, & Thorp, Bull. Torrey Bot. Club 102: 194-198. 1975; H. D. Wils., Vasc. Pl. Holmes Co. Cat. 54. 1975; Anon., Biol. Abstr. 61: AC1.732, 1976; L. J. Clark, Wild Fls. Pacif. Northw. 444-445 & 603. 1976; Grimé, Bot. Black Amer. 191. 1976; Moldenke, Phytologia 34: 248-251, 270, & 278. 1976; Van Bruggen, Vasc. Pl. S. Dak. 369, 529, & 536. 1976; [Voss], Mich. Bot. 15: 237. 1976; Moldenke, Phytologia 36: 29 & 30. 1977; F. H. Montgomery, Seeds & Fruits 201, fig. 5, & 230. 1977; Taylor & MacBryde, Vasc. Pl. Brit. Col. 436 & 751. 1977.

Additional illustrations: F. H. Montgomery, Seeds & Fruits 201, fig. 5. 1977.

Montgomery (1977) describes the seeds of this species as follows: "Nutlets 2.3 x 0.6 mm, oblong 13-14 in l.s., obtriangular 90 in c.s. with the dorsal surface rounded; surface 2-4-ribbed on the lower half and reticulate on the upper half, inner faces papillose".

Wilson (1975) cites Cooperrider 8069 from weedy railroad banks in Holmes County, Ohio. Stevens describes it as "from a woody caudex, branches prostrate" and reports it "common on dry rocky hillsides" in Washington. Higgins encountered it in sandy soil of shin-oak association areas, while Semple & Love found it in dry sandy soil of mesquite shrublands. Other recent collectors have found it growing in bare sandy soil with mesquite dominant, in sidewalk crannies, and "in agrupaciones de malezas (annual herbs mainly) in fine calcareous alluvium of sandy clay loam with Mach-aeranthera parva, Bouteloua barbata, Verbena spp., Marsilea sp., and Wislizenia sp." Moran, in Baja California, found it "prostrate, locally common with Lythrum hyssopifolium in shallow road-

side depressions".

Davidson (1959) refers to V. bracteata as a "Weed of roadsides, railways, pastures, barnyards, and other open places; common" in Iowa. In the same state Cooperrider (1962) speaks of it as "Frequent. Roadsides; along railroads; open, waste places" and records it from Clinton, Jackson, and Jones Counties. Hall & Thompson (1959) refer to it as occasional in fields and along open roadsides in Oakland County, Michigan. In Kansas it is said by Barker (1969) to be "Occasional along roadsides, cultivated fields and railway right-of-ways. Found throughout the area." Dziekanowski and his associates found it growing in loess of cultivated areas and very scattered in grassy areas with gramma grass and staghorn cactus in pinyon-juniper woodlands.

The corollas on Semple & Love 297 are said to have been "purple with white center" when fresh, but on Richardson 1580 and W. D. Stevens 1710 they were "blue", while on Moran 23634 it is stated that the corolla-tube was "purplish-pink, the limb white", on Duncan 12696 the corolla was "light-purple" and on Spellenberg & al. 4327 "pale-violet, paler in throat". Taylor & MacBryde (1977) classify the flowers and blue and red, flowering from April to September, and growing as a weed in British Columbia.

Higgins has found V. bracteata in sandy soil in Prosopis-juniper communities and in sandy to clayey soils in the Prosopis-Juniperus-grassland community. Thorne found it growing in association with Gnaphalium purpureum, G. palustre, Navarettia hamata, Amaranthus albus, etc. Moran refers to it as "occasional" near drying pond edges and "towards edge of dry laguna with abundant Sida hederacea" in Baja California. Blakley refers to it as an "annual, common locally, prostrate at moist edge of vernal lake in silty-clay soil", while Demaree found it (the erect form) to be "common" in open rock mountains of Utah. Fosberg encountered it at 20 meters altitude. Churchill encountered it "on eroded sandy slopes in sandy loam soil of upland prairie pasture with Andropogon, Solidago, etc."

Other recent collectors have encountered this species on dry riverbeds and banks, along roadsides, on dry slough bottoms, and in the Shortgrass-Prairie community. Don (1830) calls the plant "bracteose vervain" and dates its introduction into English gardens as 1820 from "Mexico".

Muehlenbach considered his no. 1525 to represent a natural hybrid between V. simplex Lehm. and V. bracteata, but I can see no evidence of such hybridity in the sample of this collection examined by me.

Perkins and his associates (1975) report that in V. bracteata the corollas are rapidly deciduous (caducous) following anthesis, the anthers and stigmas are about 1 mm. apart, the plants are less autogamous than V. halei Small and V. urticifolia L., seven plants studied with 310 potential seeds had a 21.9 percentage of seed-set when bagged, but nine plants with 765 potential seeds

had a 66.5 percent seed-set when insect-visited. The flowers were visited by the following insects: Diptera: Exoprosopa sp. (with pollen on head); Hymenoptera: Meusebeckidium obsoletum and Parnopes edwardsii; Lepidoptera: Everes comyntas, Hemiargus isola (with pollen on head), Nathalis iole, Pieris protodice (with pollen on head), Phyciodes phaon (with pollen on head), Pyrgus communis, and Strymon melinus (with pollen on head). The Exoprosopa, Hemiargus, Pieris, Pyrgus, and Strymon insects also visited the other Verbena species in the locality, i.e., V. halei, V. stricta, and V. urticifolia. The authors note that V. bracteata "was visited predominantly by butterflies".

It should perhaps be noted here that Edw. Palmer 3411, as least insofar as the Munich specimen is concerned, consists only of extremely young sterile seedlings.

The Atwood 6298, distributed as V. bracteata, is actually V. ambrosifolia Rydb., Drummond s.n. [Saint Louis, 1832] is V. canadensis (L.) Britton, Martens s.n. [Missouri] is xV. deamii Moldenke, Edw. Palmer 342 is V. lasiostachys var. septentrionalis Moldenke, and Meebold 25461 is V. stricta Vent. W. Schumann 1070 is in part V. gracilis Desf. and in part V. canescens H.B.K. Demaree 3571, in the herbarium of Louisiana State University, bears a label inscribed "Dioscorea villosa L." — doubtless a case of mixed labels. The C. A. Brown 20378, Brown & Lenz s.n. [April 7, 1939], M. Chaney 226, N. F. Petersen s.n. [Apr. 10, 1909], and Stotts s.n. [April 12, '11], also distributed as V. bracteata, all are actually V. canadensis (L.) Britton.

Additional citations: GEORGIA: Clarke Co.: Duncan 12696 (Lv). ILLINOIS: Winnebago Co.: M. S. Bebb s.n. [Fountaindale] (Mu). INDIANA: Jefferson Co.: Frazee s.n. [June 6, 1885] (Lc). LaPorte Co.: Moffatt 1685 (Mi). IOWA: Story Co.: Arthur s.n. [Ames, July 17, 1877] (Mu). TENNESSEE: Elount Co.: Hooker s.n. [borders of Ohio river below Louisville] (Mu—293). MICHIGAN: Grand Traverse Co.: J. A. Churchill s.n. [12 August 1955] (Ln—203420). WISCONSIN: Brown Co.: Schuetz s.n. [Fort Howard, July 22, 1887] (Mu). SOUTH DAKOTA: Lawrence Co.: N. F. Petersen s.n. [Aug. 17, 1908] (Lv). MISSOURI: Cass Co.: Meebold 24223 (Mu). Saint Louis: Muehlenbach 312 (Mu), 1525 (Mu), 3474 (Ac), ARKANSAS: Carroll Co.: H. H. Rusby 780 1/2 (Mu). Craighead Co.: Demaree 3571 (Lv). County undetermined: F. L. Harvey s.n. [Curtiss 1962] (Mu—1552). LOUISIANA: Lincoln Par.: J. A. Moore 5362 (Lv). UTAH: Utah Co.: Demaree 65401 (Ld). NEVADA: Lyon Co.: Tiehm 1812 (N). Storey Co.: Purpus 5946 (Mu—4287). COLORADO: Archuleta Co.: Weber & Livingston 6259 (Mi). Denver Co.: Cole 5687 [Herb. Kent Sci. Mus. 51385] (Mi). Elbert Co.: S. R. Hill 1277 (N). El Paso Co.: Meebold 12269 (Mu). NEBRASKA: Pierce Co.: N. F. Petersen s.n. [Aug. 11, 1910] (Lv), s.n. [Aug. 12, 1910] (Lv). Polk Co.: S. P. Churchill

6606 (N). IDAHO: Gooding Co.: R. J. Davis 1781 (N). TEXAS: Bowie Co.: Correll & Correll 12398 (Mi). Martin Co.: Semple & Love 297 (W--2732736). NEW MEXICO: Catron Co.: Pinkava, Lehto, & Reeves P.12492 (N, W--2737086). Curry Co.: Higgins 9050 (N). Dona Ana Co.: Chiang, Wendt, & Johnston 8621 (Ld). Guadalupe Co.: Higgins 8925 (N). McKinley Co.: Spellenberg, Reitzel, & McKinney 4327 (N). Roosevelt Co.: Higgins 8672 (N). San Miguel Co.: Higgins 8886 (N). Torrence Co.: Dzieskanowski, Dunn, & Bennett 2390 (N). Union Co.: Higgins 8810 (N). ARIZONA: Greenlee Co.: Pinkava, Lehto, & Reeves P.12421 (N). WASHINGTON: Benton Co.: Dzieskanowski, Dunn, & Bennett 2518 (N). Klickitat Co.: Doppelbauer & Doppelbauer 663 (Mu). Yakima Co.: W. D. Stevens 1710 (Ln--244892). OREGON: Malheur Co.: Doppelbauer & Doppelbauer 824 (Mu). CALIFORNIA: Los Angeles Co.: F. R. Fosberg S.4105 (Sd--72779); Parish & Parish 1596 (Mu--1553); Thorne 36516 (Sd--69553). San Luis Obispo Co.: Edw. Palmer 3411 (Mu). CHANNEL ISLANDS: Santa Catalina: Blakley 5394 (Sd--85037). MEXICO: Baja California: R. V. Moran 16110 (Sd--71446), 16627 (Sd--72969), 23634 (Ld). Coahuila: Richardson 1580 (Au--302675). CULTIVATED: Germany: Herb. Kummer s.n. [Hort. bot. Monac. 1843] (Mu--1249); Herb. Zuccarini s.n. [Hort. bot. Monac. 1836] (Mu--295); Schrank s.n. [Hort. Monac.] (Mu--290). Sweden: Collector undetermined s.n. (Ac). LOCALITY OF COLLECTION UNDETERMINED: Herb. Reg. Monac. 291 (Mu).

VERBENA BRASILIENSIS Vell.

Additional synonymy: Verbena litoralis pycnostachya Schau. ex Moldenke, Fifth Summ. 2: 680, in syn. 1971.

Additional & emended bibliography: Buek, Gen. Spec. Syn. Candoll. 3: 494 & 495. 1858; Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl., imp. 1, 716. 1969; G. W. Thomas, Tex. Pl. Ecolog. Summ. 77. 1979; Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl., imp. 2, 716. 1974; D. S. & H. B. Correll, Aquat. & Wetland Pl. SW. U. S., imp. 2, 2: 1396, 1397, & 1775. 1975; Moldenke, Phytologia 30: 136 (1975), 31: 375 & 377 (1975), and 34: 248--250, 257, 260, & 270. 1976; Soukup, Biota 11: 18. 1976.

Ferreira refers to this plant as a shrub, 1.2 m. tall, and found it growing in "brejo" (sedge meadow). Roivainen found it with Lupinus arboreus "en la zona humosa-arenisca" in Chile. In Ecuador it was encountered at 2850 meters altitude by Heinrichs. Other recent collectors have found it growing in pine forests, at the edges of ditches, in dry soil in sunny places, in "poorly drained stiff soil", and in shallow pools on prairies. Monz refers to it as "scarce" and as "scattered but relatively abundant on roadsides" in Louisiana, Curry found it frequent along banks and among Colocasia, Kirby reports it abundant on railroad banks, and Rockett refers to it as common in waste places. Moore calls it a roadside weed and Claycomb asserts that in Louisiana it is

"a very common roadside weed".

On Ross 66 the label asserts that the leaves and stems were dark-green, while on C. A. Brown 2393 the collector informs us that there were "thick and thin spikes on the same plant". Hebert refers to the species as "abundant in open cornfields". The corollas on Ferreira 126 are said to have been "lilac" in color when fresh, while on Athanasius 64 and Van Wyk 267 they were "blue", on C. Allen 107, C. M. Allen 381, Chandraparya 2, Rockett 125, and Ross 66 they were "purple", on Duque-Jaramillo 2734 they were "light-blue", on Bougere 14 and R. R. Smith 1732 "lavender", and on Krapovickas & al. 26799 "violet".

Additional vernacular names reported for V. brasiliensis are "kudii penkel" and "verbena morada". In addition to months previously reported, the species has been collected in fruit in March. It has been found growing at altitudes of 200 to 3700 meters in Peru. Demaree speaks of it as "common" or "very common" in wet open woods and disturbed areas in Arkansas and in rocky bottoms in Alabama. Werff comments that on Chatham Island, in the Galápagos, its flowers were "smaller and much more intense blue" than those on his no. 2181 (an as yet undetermined species).

The Claycomb s.n. [July 6, 1942] and Montz 1824, distributed as V. brasiliensis, actually are V. bonariensis L., while Hort. Parag. 10054, Romero-Castafieda 10668, and T. Rojas 1889 are actually V. litoralis H.B.K. and Muhammad 259 and Urbatsch 1938 are V. montevidensis Spreng.

Additional citations: NORTH CAROLINA: Robeson Co.: Moldenke & Moldenke 29997 (Ac). SOUTH CAROLINA: Bamberg Co.: Moldenke & Moldenke 29963 (Ac, Ld, Tu). Clarendon Co.: Moldenke & Moldenke 29977 (Tu). Dillon Co.: Moldenke & Moldenke 29989 (Ld). Greenwood Co.: Moldenke & Moldenke 29263 (Ld). Marion Co.: Moldenke & Moldenke 29987 (Kh). Orangeburg Co.: Moldenke & Moldenke 29970 (Ac), 29971 (Gz). GEORGIA: Chatham Co.: Moldenke & Moldenke 29924 (Ac, Gz, Ld). Dougherty Co.: Moldenke & Moldenke 29361 (Ac). St. Simon's Island: Moldenke & Moldenke 29900 (Ac, Ld, Tu). FLORIDA: Escambia Co.: Meebold 27240 (Mu); R. R. Smith 1732 (Sd—74167); S. M. Tracy 8706 (Ln—70125). Putnam Co.: Moldenke & Moldenke 29845 (Gz). ALABAMA: Montgomery Co.: Demaree 70060 (Ld). MISSISSIPPI: Warren Co.: C. A. Brown 18610 (Lv). ARKANSAS: Cleveland Co.: Demaree 69748a (Ld). Lincoln Co.: Demaree 70225 (Ld). Saint Francis Co.: Demaree 15103 (Lv). LOUISIANA: Acadia Par.: Chandraparya 2 (Lv). Bossier Par.: Robinette 239 (Lv). East Baton Rouge Par.: C. Allen 107 (Lv); C. A. Brown 1008 (Lv); Curry 615 (Lv), 666 (Lv); Hebert 207 (Ld); Ross 66 (Lv). Lafayette Par.: Claycomb s.n. [June 13, 1942] (Lv). Lincoln Par.: Keiser 91 (Lc); D. K. Lowe 31 (Lv); J. A. Moore 5200 (Lv). Orleans Par.: C. A. Brown 238 (Lv), 2393 (Lv); Meebold 27224 (Mu). Ouachita Par.: B. Thompson & Botany

Class 157 (Lc). Plaquemines Par.: C. A. Brown 2309 (Lv). Pointe Coupee Par.: M. Chaney 111 (Lv). Saint Charles Par.: Montz 56 (Lv), 182 (Lv), 566 (Lv), 637 (Lv, Lv, Lv), 726 (Lv), 790 (Lv). Saint Helena Par.: C. M. Allen 381 (Lv); Rockett 125 (Lv). Saint Tammany Par.: Bougere 14 (Lv), 1091 (Lv), 1099 (Lv). Tangipahoa Par.: Frederick 108 (Lv); Kirby 160 (Lv). Terrebonne Par.: Arce-neaux s.n. [July 20, '37] (Lv); Bynum, Ingram, & Jaynes s.n. [Houma, Apr. 23, 1933] (Lv). West Feliciana Par.: Curry, Martin, & Allen 38 (Lv); Seib 10 (Lv). TEXAS: Jefferson Co.: Stutzenbaker 205 (Mu). CALIFORNIA: Butte Co.: Moldenke & Moldenke 30291 (Ac, Ld, Mu, W). COLOMBIA: Cundinamarca: Duque-Jaramillo 2707 (N), 2734 (N). ECUADOR: Tunguragua: Heinrichs 65 (Mu). GALAPAGOS ISLANDS: Chatham: Werff 218 [1482] (Ld). BRAZIL: Minas Gerais: Irwin, Harley, & Onishi 29512 (W--2759076). Paraná: L. F. Ferreira 126 (Ld). Rio Grande do Sul: Reineck & Czermak 63 (Mu). State undetermined: Martius 1033 (Mu). BOLIVIA: La Paz: M. Bang 136 (Mu--1785). CHILE: Cautin: Roivainen 3054 (Mu). Concepción: Neger s.n. [1893-96] (Mu--3984). Valdivia: Athanasius 64 (Mu). Valparaiso: Behn s.n. [Quilpué, 22 Januar 1931] (Mu). ARGENTINA: Córdoba: Lorentz 131 [Macbride photos 20316] (Mu); Pierotti s.n. [27/I/1944] (Ut--330559B, Ut--330575B). Corrientes: Krapovickas, Cristóbal, Irigoyen, & Schinini 26799 (Ld). Mendoza: Ruiz Leal 8393 (Ut--330558B). SOUTH AFRICA: Natal: Meebold 12840 (Mu). Transvaal: Van Wyk 267 (Ac).

VERBENA CABRERAE Moldenke

Additional bibliography: Moldenke, *Phytologia* 28: 120, 195, 197, & 440 (1974) and 31: 388. 1975.

Additional citations: ARGENTINA: Jujuy: Krapovickas, Schinini, & Quarín 26689 (Ld).

VERBENA CABRERAE var. ANGUSTILOBATA Moldenke

Additional bibliography: Moldenke, *Phytologia* 28: 195, 197, & 440. 1974.

VERBENA CALIFORNICA Moldenke

Additional bibliography: Moldenke, *Phytologia* 28: 197. 1974.

McNeal 925, a topotype, distributed as V. officinalis L., was collected in moist rocky serpentine soil in streambed crossing (the actual type locality!), flowering in May. This is apparently the exact spot where my wife and I, as well as our son, observed and collected this plant and where our son originally discovered it.

Additional citations: CALIFORNIA: Tuolumne Co.: McNeal 925 (N).

VERBENA CALLIANTHA Briq.

Additional bibliography: Moldenke, *Phytologia* 30: 136. 1975.

Troll encountered this species on páramos at 3400 meters alti-

tude. Porto & Oliveira describe it as stoloniferous, the "petals red (5P5/9)".

Additional citations: BRAZIL: Rio Grande do Sul: Porto & Oliveira ICN.9585 (Ut--320460). BOLIVIA: Province undetermined: Troll 281 [Altos del Escalon] (Mu).

VERBENA CAMERONENSIS L. I. Davis

Additional & emended bibliography: Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl., imp. 1, 716. 1969; G. W. Thomas, Tex. Fl. Ecolog. Summ. 77. 1969; Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl., imp. 2, 716. 1974; Moldenke, Phytologia 28: 243. 1974; Hocking, Excerpt. Bot. A.26: 5. 1975.

Martínez-Calderón found this plant growing in "acahual" secondary vegetation, at 6 meters altitude, and the corollas on his no. 1246 are said to have been "blue".

Additional citations: MEXICO: Veracruz: Martínez-Calderón 1246 (N).

VERBENA CAMPESTRIS Moldenke

Additional bibliography: Moldenke, Phytologia 23: 218 (1972) and 36: 35. 1977.

Kummrow found this plant growing in "orla campo das encosta de pequenos morros", flowering in September, and describes the corollas as white.

Additional citations: BRAZIL: Paraná: Kummrow 1142 (Z).

VERBENA CANADENSIS (L.) Britton

Additional synonymy: Verbena lamberti B. M. ex G. Don in Loud., Hort. Brit., ed. 1, 247. 1830. Glandularia aubletia α Spach, Hist. Nat. Veg. Phan. 9: 240. 1840. Glandularia aubletia β Spach, Hist. Nat. Veg. Phan. 9: 240. 1840. Verbena pulchella erinoides Zucc. ex Moldenke, Phytologia 34: 279, in sphalm. 1976.

Additional & emended bibliography: G. Don in Loud., Hort. Brit., ed. 1, 247 (1830) and ed. 2, 247. 1832; G. Don in Loud., Hort. Brit. Suppl. 1: 680. 1832; Loud., Hort. Brit., ed. 2, 552 & 602. 1832; Loud., Hort. Brit., ed. 3, 602. 1839; Baxt. in Loud., Hort. Brit. Suppl. 2: 680. 1839; Spach, Hist. Nat. Veg. Phan. 9: 239--240. 1840; Baxt. in Loud., Hort. Brit. Suppl. [3]: 655. 1850; Schnitzlein, Iconogr. Fam. Nat. 2: 137 Verbenac. [3] & 137: fig. 3. 1856; Buek, Gen. Spec. & Syn. Candoll. 3: 199, 494, & 495. 1858; Vilm., Fl. Pleine Terr., ed. 1, 936 (1865), ed. 2, 2: 973--974 (1866), and ed. 3, 1: 1197. 1870; Kuntze, Rev. Gen. Pl. 2: 510. 1891; Voss in Vilm., Fl. Pleine Terr., ed. 4, 1065 & 1070. 1894; Loes., Verh. Bot. Ver. Brand. 53: 75. 1912; Barker, Univ. Kans. Sci. Bull. 48: 571. 1969; Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl., imp. 1, 715 & 716. 1969; G. W. Thomas, Tex. Fl. Ecolog. Summ. 77. 1969; Healy, Gard. Guide Pl. Names 225. 1972; Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl., imp. 2, 715 & 716. 1974; El-Gazzar, Egypt. Journ. Bot. 17: 75 & 78. 1974; Kooiman, Act. Bot. Neerl. 24: 463. 1975; Moldenke, Phytologia 30: 136--138 (1975) and 31: 376, 377, 409, & 411. 1975; H. D. Wils., Vasc. Pl. Holmes Co. Cat. 54.

1975; Fleming, Genelle, & Long, Wild. Fls. Fla. 15 & 82. 1976; Moldenke, Phytologia 34: 249, 250, 270, 274, & 279. 1976; Vanderpoel, Natl. Wildlife 15 (1): 50. 1976; A. L. Moldenke, Phytologia 36: 88. 1977.

Additional illustrations: Voss in Vilm., Fl. Pleine Terr., ed. 3, 1: 1197 (1870) and ed. 4, 1065. 1894; Vanderpoel, Natl. Wildlife 15 (1): 50 [in color]. 1976.

It should be noted here that Spach's var. α is based on the original V. aubletia L. and is characterized by him as "a fleurs pourpres", while his var. β is based on V. drummondii (Lindl.) Baxt. and is characterized as "a fleurs lilas". He regards Billardiera explanata Moench as a synonym of var. α . Of the species he says "Cette espèce, originaire des provinces méridionales des États-Unis, se cultive fréquemment comme plante de parterre".

Tans describes the material of V. canadensis which he collected "in recently landscaped roadside gravel in partial shade" as somewhat sprawling, the corollas rose-purple, the corolla-tube 17 mm. long, its limb 12 mm. wide, and the calyx 12 mm. long. Stephens found the species "in dry rocky limestone soil on prairie pasture hillside". Waterfall encountered it in openings in oak-hickory woods on stony hillsides. The corollas on D'Arcy & Beckner 1656 are said to have been "showy blue-purple", while on LePine 5056 they were "lavender", on Guguch 92 they were "rose", and on Ware 51 they were "blue".

Healy (1972) lists the horticultural varieties: "Compacta Amethyst", "Miss Susie Double", "Olympia", and "Royal Bouquet". These are listed as though varieties of V. canadensis, but certainly the last-mentioned (and perhaps all) is a cultivar of xV. hybrida Voss. Darlington & Wylie (1956) refer to V. canadensis as native to "N. & S. Am.", but this is erroneous -- it is not known from South America! Don (1830) calls V. aubletia "Aublet's vervain" and V. lamberti "Lambert's vervain", both now usually regarded as synonyms of V. canadensis. He dates the introduction of Aublet's vervain into English gardens as 1774 from "N. Amer.", but Lambert's vervain he says was introduced from "S. Amer.", date not known. This latter statement does not seem likely.

In this connection it should be noted here that the Bahama Islands collection cited below does not indicate on its accompanying label that it originated from cultivated material, but I assume that it did, since it is most unlikely that V. canadensis should occur in the wild state on these islands.

The "V. canadensis" illustrated by Fleming, Genelle, & Long (1976) actually is V. temisecta Briq.!

Wilson (1975) cites H. D. Wilson 1860 from Holmes County, Ohio, based on "a single plant".

Recent collectors have encountered V. canadensis on dissected stream terraces, in cleared thickets on ridges, in mixed woods, open fields, and wooded areas on black calcareous soil, on "hill-

side rocks", under mixed hardwoods on dry hillsides, in clay soil of grassy fields with Trifolium, in black or black calcareous soil of prairies, and in novaculite bottoms. LePine refers to it as a common perennial, while Guguch calls it an occasional herbaceous perennial. Collectors describe it as erect, with a flat-topped inflorescence, the stems ascending, 4--5 dm. tall, and the flowers odorless. Barker (1969) reports it "Common, in rocky upland prairies, on rocky prairie slopes, on rocky roadside embankments and along railroad right-of-ways. Found throughout the area."

Other recent collectors have found the species in the red soil of dry pine flatwoods in Texas, while Demaree reports it "common in dolomite glades" in Arkansas.

The Herb. Staatssamml. Münch. s.n. and Herb. Hort. Monac. s.n., originally distributed as V. canadensis, are actually V. andrieuxii Schau., while J. A. Churchill s.n. [14 May 1954], Herb. Reg. Monac. s.n. [Missouri], and R. Kral 26422 are V. bipinnatifida Nutt., Karwinski s.n. [In imperio mexicano] is V. elegans H.B.K., Purpus 6061 is V. gooddingii Briq., Lindheimer IV. 501 is V. pumila Rydb., Kirby 116 is V. rigida Spreng., Curtiss 1963 is V. tampensis Nash, and C. A. Brown 5636 is V. tenuisecta Briq.

Copper s.n. [June 23, 1959] is anomalous in having the leaves of V. canadensis and the calyxes of V. ambrosifolia Rydb.

Additional citations: FLORIDA: Alachua Co.: D'Arcy & Beckner 1656 (Sd--85760). ALABAMA: Tuscaloosa Co.: Nevius s.n. (Lv, Lv). OHIO: County undetermined: Frank s.n. [1837] (Mu--262). TENNESSEE: Wilson Co.: J. A. Churchill s.n. [24 April 1971] (Ln--236291). WISCONSIN: Walworth Co.: Tans 1476 (Ts). KANSAS: Franklin Co.: Copper s.n. [June 23, 1959] (Lc). Lyon Co.: Sudweeks s.n. [6/13/60] (Lc). Osage Co.: Roush s.n. [6/16/59] (Lc); Stephens 30597 (Sd--74400). MISSOURI: Barry Co.: Meebold 25570 (Mu). Cooper Co.: McReynolds 750651 (Lv). Jackson Co.: Meebold 22681 (Mu), 25248 (Mu). St. Louis: Drummond s.n. [Saint Louis, 1832] (Mu--294). ARKANSAS: Carroll Co.: Demaree 53464 (Ln--236563). Drew Co.: Demaree 16566 (Lv). Hot Springs Co.: Demaree 16920 (Lv). LOUISIANA: Ascension Par.: Ware 51 (Lv). Bossier Par.: Robinette 67 (Lv). Caddo Par.: C. A. Brown 20378 (Lv); N. F. Petersen s.n. [Apr. 10, 1909] (Lv). East Baton Rouge Par.: C. A. Brown s.n. [Sept. 30, 1936] (Lv). Matchitoches Par.: C. A. Brown 7147 (Lv). Ouachita Par.: Garland 200 (Lv); Thomas & Jones 1684 (Kl--11393). Pointe Coupee Par.: M. Chaney 226 (Lv). Saint John the Baptist Par.: Guguch 92 (Lv); LePine 5056 (Lv). Saint Tammany Par.: Arsène 11982 (Lv). Winn Par.: Brown & Lenz 7607 (Lv), s.n. [April 7, 1939] (Lv); N. F. Petersen s.n. [4-12-12] (Lv). OKLAHOMA: Creek Co.: J. A. Churchill s.n. [13 April 1953] (Ln--203426), Mayes Co.: Waterfall 15292 (Mu). Tulsa Co.: Stutts s.n. [April 12,

'41] (Lv). TEXAS: Harris Co.: J. A. Churchill s.n. [1 May 1955]. (Ln--204153). LOCALITY OF COLLECTION UNDETERMINED: Prince Paul of Wurtemberg s.n. [America sept. civit. confed. 1831] (Mu--1567). CULTIVATED: Austria: Herb. Zuccarini s.n. [hort. Hügel, Vindob. 1839] (Mu--269). Bahama Islands: Herb. Schmiedel s.n. [Ins. Bahamensis] (Mu--256). Germany: Herb. Grimm s.n. [1787] (Mu--255); Herb. Reg. Monac. 263 (Mu); Herb. Schmiedel s.n. [h. Selton. '87] (Mu--257); Herb. Schreber s.n. [Hort. Erlang. 1778] (Mu--258), s. n. [Hort. Erlang. 1785] (Mu--259); Herb. Univ. Ludv. Maximil. s.n. (Mu--251); Herb. Zuccarini s.n. [Hort. bot. Monac.] (Mu--264, Mu--265); Schrank s.n. [Hort. Monac.] (Mu--250).

VERBENA CANADENSIS (L.) Britton x V. AMBROSIFOLIA Rydb.

Additional bibliography: Moldenke, Phytologia 28: 199--200 & 451. 1974.

Copper s.n. [June 23, 1959], cited under V. canadensis, has intermediate characters between that species and V. ambrosifolia and may thus represent this hybrid.

VERBENA CANADENSIS (L.) Britton x V. ELEGANS H.B.K.

Additional bibliography: Moldenke, Phytologia 28: 200 & 451. 1974.

VERBENA CANADENSIS (L.) Britton x V. MARITIMA Small

Additional bibliography: Moldenke, Phytologia 28: 200, 451, & 464. 1974.

VERBENA CANADENSIS (L.) Britton x V. PERUVIANA (L.) Britton

Additional bibliography: Moldenke, Phytologia 28: 200, 451, & 464. 1974.

VERBENA CANADENSIS (L.) Britton x V. TAMPENSIS Nash

Additional bibliography: Moldenke, Phytologia 28: 200, 451, & 465. 1974.

VERBENA CANESCENS H.B.K.

Additional synonymy: Verbena canescens var. canescens [H.B.K.] apud Thomas, Tex. Pl. Ecolog. Summ. 77. 1969.

Additional & emended bibliography: Sweet, Hort. Brit., ed. 2, 419. 1830; G. Don in Loud., Hort. Brit., ed. 1, 247 (1830), ed. 2, 247. 1832; Loud., Hort. Brit., ed. 2, 552 & 553. 1832; G. Don in Loud., Hort. Brit., ed. 3, 247. 1839; Buek, Gen. Spec. Syn. Candoll. 3: 494. 1858; Loes., Verh. Bot. Ver. Brand. 53: 74. 1912; Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl., imp. 1, 716. 1969; G. W. Thomas, Tex. Pl. Ecolog. Summ. 77. 1969; Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl., imp. 2, 716. 1974; El-Gazzar, Egypt. Journ. Bot. 17: 75 & 78. 1974; Moldenke, Phytologia 30: 138, 156, & 165 (1975), 31: 377 & 378 (1975), and 34: 251, 252, & 278. 1976.

Don (1830) calls this the "canescent vervain" and dates its introduction into English gardens from Mexico as 1824, but Loudon (1832) dates its introduction as 1820. Thomas (1969) calls it the "gray verbena".

Recent collectors have encountered this plant in clayish soil of desert scrub, in calcareous loam in chaparral on steep encanoyoned conglomerate fans, in calcareous gravelly soil of "matorral desértico microfilo inerme" on limestone hills, in open hilly limestone areas, on rock and gravel in xerophytic canyons, in "matorral desértico inerme y con espinas laterales" on mostly limestone hillsides with some extrusive igneous rock on top, on limestone gravel and rocky limestone slopes, and in "matorral subdesértico inerme y con espinas laterales" on flat areas near the bottom of "bajadas", growing in association with Larrea tridentata, Parthenium incanum, Celtis pallida, Flourensia cernua, Yucca carnerosana, Agave lecheguilla, Vauquelinia corymbosa, Fouquieria splendens, Amelanchier, Acacia, Opuntia, Mortonia, Lycium, Mimosa, and Dasyliirion. Henrickson refers to it as "frequent" in some localities and as an "infrequent perennial" in others. Ellis and his associates found it on "oak scrub hills with Lupinus and Populus".

The corollas are said to have been "violet" on Henrickson 6263. Demaree asserts that there were "not many" of these plants where he made his Texan collection. Loesener (1912) cites Seler & Seler 3488 from Coahuila, Mexico.

Material of V. canescens has been misidentified and distributed in some herbaria as "Verbena halii Small". On the other hand, the W. M. Jones 7, distributed as V. canescens, actually is var. roemeriana (Scheele) Perry; W. Schumann 1070 is a mixture with V. gracilis Desf.

Additional citations: TEXAS: Bexar Co.: Meebold 27301 (Mu). Tarrant Co.: Demaree 66202 (Ld). MEXICO: Chihuahua: Ellis, Le Doux, & Watkins 964 (N). Coahuila: Henrickson 11601 (Ld); Johnston, Wendt, & Chiang C. 10276b (Ld); Johnston, Wendt, Chiang C., & Riskind 11740g (Ld); Marsh 1687 (Ld). Jalisco: Schumann 1070, in part (Mu). Nuevo León: Painter, Lucas, & Barkley 14276 (Ld). Oaxaca: Pringle 4784 (Mu--1802). Puebla: Ventura A. 1574 (Sd--78100). San Luis Potosí: Schaffner s.n. [1875-79] (Mu--1557). Tamaulipas: Painter & Barkley 15373 (Ld). Zacatecas: Chiang, Wendt, & Johnston 7901 (Ld), 7920 (Ld); Henrickson 6263 (Ld); Johnston, Chiang, & Wendt 10435 (Ld), 10440 (Ld).

VERBENA CANESCENS var. ROEMERIANA (Scheele) Perry

Additional bibliography: G. W. Thomas, Tex. Pl. Ecolog. Summ. 77. 1969; Moldenke, Phytologia 30: 138, 156, & 165 (1975), 31: 378 (1975), and 34: 251. 1976.

Thomas (1969) calls this the "Roemer verbena".

Additional citations: TEXAS: Brown Co.: J. Reverchon s.n. [Cur-

tiss 1961] (Mu--1556). Caldwell Co.: W. M. Jones 7 (Mu). Cameron Co.: R. Runyon 629 (Mu). Comal Co.: Lindheimer 1074 (Mu--4086). Kerr Co.: E. J. Palmer 10002 (Mu).

VERBENA CAROLINA L.

Additional & emended synonymy: Verbena carolinensis, melissae folio aspero Dill. in Ray, Synop. Meth. Stirp. Brit., ed. 3, pl. 301, fig. 388. 1724. Verbena polystachya Kunth ex G. Don in Loud., Hort. Brit., ed. 1, 246. 1830. Verbena carolinensis etc. Dill. ex Schau. in A. DC., Prodr. 11: 546, in syn. 1847. Verbena carolinensis &c. Dill. ex Buek, Gen. Spec. Syn. Candoll. 3: 494, in syn. 1858. Verbena carolineana El-Gazzar, Egypt. Journ. Bot. 17: 75 & 78. 1974. Verbena carolina var. polystachya (H.B.K.) Schimpff ex Moldenke, Phytologia 34: 278, in syn. 1976.

Additional & emended bibliography: Dill. in Ray, Synop. Meth. Stirp. Brit., ed. 3, pl. 301, fig. 388. 1724; G. Don in Loud., Hort. Brit., ed. 1, 246 (1830) and ed. 2, 246. 1832; Loud., Hort. Brit., ed. 2, 552. 1832; G. Don in Loud., Hort. Brit., ed. 3, 246. 1839; Buek, Gen. Spec. Syn. Candoll. 3: 494--496. 1858; Druce & Vines, Dill. Herb. 182. 1907; Loes., Verh. Bot. Ver. Brand. 53: 74. 1912; Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl., imp. 1, 716 (1969) and imp. 2, 716. 1974; El-Gazzar, Egypt. Journ. Bot. 17: 75 & 78. 1974; Garcia, MacBryde, Molina, & Herrera-MacBryde, Malez. Preval. Cent. Am. 143 & 161. 1975; Hinton & Rzedowski, Anal. Esc. Nac. Cienc. Biol. 21: 111. 1975; López-Palacios, Revist. Fac. Farm. Univ. Los Andes 15: 92. 1975; Moldenke, Phytologia 30: 138--139 (1975) and 31: 378. 1975; Molina R., Ceiba 19: 95. 1975; Soukup, Biota 11: 18. 1976; Moldenke, Phytologia 34: 270, 278, & 281 (1976) and 36: 47. 1977.

Additional illustrations: Dill. in Ray, Synop. Meth. Stirp. Brit., ed. 3, pl. 301, fig. 388. 1724; Garcia, MacBryde, Molina, & Herrera-MacBryde, Malez. Preval. Cent. Am. 143 (in color). 1975.

According to Druce & Vines (1907) the Dillen pre-Linnean designation for this species is represented in his herbarium by a cultivated specimen from the Eltham Garden, collected in 1726, and referred to V. caroliniana Willd. by Klinsmann, to V. polystachya H.B.K. by Asa Gray, and finally to V. carolina L.

Don (1830) calls the species the "Carolina vervain" and gives 1732 as the date of its introduction from "N. Amer." into English gardens -- but it was in cultivation there as early as 1726 according to Dillen. The cospecific V. veronicaefolia he calls the "veronica-leaved vervain" and avers that it was introduced from Mexico in 1825; V. polystachya he calls the "many-spiked vervain" and dates its introduction into English gardens from Mexico as 1820.

It should be noted here that the specimen from the Bahama Islands, cited below, does not bear any indication on its accompanying label that it came from cultivated material, but I am assuming that it did because V. carolina is not known in the wild

condition on those islands.

Recent collectors have encountered V. carolina in pinelands, along streams in granitic canyons "growing with Cordia, Quercus, Phaseolus, Ipomopsis, grasses, and herbs", and "in pine forests, some parts of which were severely cutover, in basic usually thin sandy soil capped by thick basalt, but with soft bedded volcanic underneath, with caves containing well-preserved Amerind pueblos and relics in the overhang, growing with Pinus spp. and Quercus spp." Henrickson refers to it as an "infrequent annual in disturbed areas". The corollas were "blue" on Contreras 10972 and "violet-blue" on Colaris 1529.

Loesener (1912) cites Seler & Seler 1304 from Mexico. The Karwinski s.n. [in imperio mexicano], distributed as V. carolina, actually is V. ehrenbergiana Schau., while Martínez Calderón 1352 is V. longifolia f. albiflora Moldenke, H. H. Rusby 780 is V. macdougallii Heller, Spencer s.n. [1916.4.25] is V. menthaefolia Benth., Karwinski s.n. is V. recta H.B.K., C. A. Brown 3892, Parish & Parish 1043, and Wurzlow s.n. [June 20, 1912] are V. scabra Vahl, Herb. Schwaegrichen s.n., Herb. Zuccarini s.n. [h. b. Mon. 1819], and Schoepf s.n. [ad New York] are V. simplex Lehm., and Herb. Reg. Monac. 250 is Stachytarpheta angustifolia f. elatior (Schrad.) López-Palacios.

Additional citations: ARIZONA: County undetermined: Stalmach 198 (Au—122071). MEXICO: Chihuahua: McCabe 440 (Ws); Wilson, Johnston, & Johnston 8595 (Ld). Federal District: Barkley, Rowell, & Webster 2199 (Ln—189707). México: Salinas M. 85 (Ws). Oaxaca: Colaris 1529 (Ut—328615B); Pringle 4892 (Mu—1804). Zatecas: Henrickson 13492 (Ld). GUATEMALA: Baja Verapaz: Contreras 10972 (W—2795345). Guatemala: Kellerman 6540 (Ld). Santa Rosa: Heyde & Lux 3019 (Mu—1808). Sololá: Kellerman 5825 (Ac, Au). CULTIVATED: Bahama Islands: Herb. Schmiedel s.n. [Insul. Bahamens.] (Mu—297). Germany: Schreber s.n. [Hort. Bot. Erlang.] (Mu—298).

VERBENA CAROLINA f. ALBIFLORA Moldenke

Additional bibliography: Buek, Gen. Spec. Syn. Candoll. 3: 495. 1858; Moldenke, Phytologia 28: 203 & 432. 1974.

Additional citations: MEXICO: Veracruz: Gutierrez R. 342 (Ws).

VERBENA CATHARINAE Moldenke

Additional bibliography: Moldenke, Phytologia 28: 203. 1974.

Hatschbach encountered this plant along roadsides and the corollas are said to have been "deep-lilac" on Hatschbach 14968.

Additional citations: BRAZIL: Paraná: Hatschbach 14954 [Herb. Brad. 48008] (Mu), 14968 [Herb. Brad. 48009] (Mu).

VERBENA CHILENSIS Moldenke

Additional bibliography: Moldenke, Phytologia 23: 186 (1972)

and 34: 260. 1976.

Additional citations: CHILE: Valdivia: Neger s.n. [Villarrica, 1897] (Mu—3983).

VERBENA CILIATA Benth.

Additional & emended bibliography: Buek, Gen. Spec. Syn. Candoll. 3: 494. 1858; Loes., Verh. Bot. Ver. Brand. 53: 75. 1912; Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl., imp. 1, 716. 1969; G. W. Thomas, Tex. Pl. Ecolog. Summ. 77. 1969; Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl., imp. 2, 716. 1974; Hinton & Rzedowski, Anal. Esc. Nac. Cienc. Biol. 21: 111. 1975; E. H. Jordan, Checklist Organ Pipe Cact. Natl. Mon. 7. 1975; Moldenke, Phytologia 30: 132 & 139 (1975) and 34: 252 & 270. 1976; A. L. Moldenke, Phytologia 35: 173. 1977.

Tilforth describes this plant as an "annual, branched from base and above, decumbent to ascending, common but in groups. Other recent collectors have encountered it "on mezquital and tobosa flats in alluvial bajadas in fine textured alluvial soil", "in creosote scrub of Chihuahuan Desert", "in open Chihuahuan Desert with rocky reddish clay soil", in clay soil of dry lakes, in rocky clay soil, in small ravines, "in limestone soil of rugged limestone sierra", "in matorral desértico microfilo inerme on broad alluvial flats, in calcareous adobe alluvium", "in limestone soil in areas of extensive chaparral and oaks, the lower slopes with Yucca carnerosana and Dasyllirion, the upper slopes with Pinus ponderosa and Agave macroculmis", "in chaparral with many pines on the higher slopes, in steep canyon through mountains of igneous rock, mostly intrusive basics, in gravelly, crussy and sandy soils derived from the igneous rock", "in calcareous gravelly adobe of matorral subdesértico inerme y con espinas laterales in flat areas near bottom of bajada", "in gravelly pale alluvial adobe soil of izotal of Yucca filifera in low flat valley bottoms between gentle hills", and in open pine-juniper woodland-meadow areas, growing in association with Prosopis glandulosa, Hilaria mutica, Agave lecheguilla, Yucca carnerosana, Y. filifera, Larrea tridentata, Opuntia imbricata, Celtis pallida, Flourensia cernua, Atriplex, Bahia, Conyza, Salsola, Acacia, Buddleia, Jatropha, Parthenium, Aloysia, Clematis, Sicyos, Quercus, Pinus, Pseudotsuga, Ceanothus, Cercocarpus, Salvia, Carex, Bidens, Eryngium, pinyon, juniper, various composites, and numerous annuals. Torke and his associates found it in "red soil, still heavily cultivated area with some cacti and associates", at 5750 feet altitude. Stuessy refers to it as "scarce in Prosopis-Larrea scrub". Davidse encountered it "in Bouteloua grassland with low shrubs and Opuntia".

Collectors describe the plant as a small decumbent perennial, 6 inches to 1 foot tall. Henrickson refers to it as "frequent" or "infrequent" and as "a common roadside weed".

The corollas on Henrickson 13293 and Ventura A. 1646 are said to have been "purple", while on Tilforth 562 they were "purple

with externally white lobes", on Henrickson 6345c & 11212 they were "violet", on Henrickson 5950b "light-violet", on Henrickson 3027 "red-violet", on Johnston, Chiang, & Wendt 10432 "deep-pink", on Chiang, Wendt, & Johnston 7987 "dark rose-pink", and on Stuessy 965 "pale-blue". Thomas (1969) calls it the "fringe verbenae".

Mrs. Jordan (1975) records the common name, "hairy verbenae".

Loesener (1912) cites Seler & Seler 1120, 1173, 1174, 1379, & 3555 from Guanajuato, Michoacán, Tlaxcala, and Oaxaca, Mexico, and 4056 from Kinney County, Texas.

The Reeves & Pinkava 11933, distributed as V. ciliata, is actually V. bipinnatifida Nutt., while J. A. Churchill s.n. [23 April 1953] is V. ciliata var. pubera (Greene) Perry, Edw. Palmer 339, Reeves & Lehto R.1166, Reeves & Pinkava 11947, and Warren & Turner 68-87 are V. gooddingii Briq., Fugate, McLaughlin, & McManus 652. and Warren & Turner 68-33 are V. gooddingii var. nepetifolia Tidestrom., T. Reeves R.1166 is xV. perplexa Moldenke, Lindheimer 1075 is V. pumila Rydb., Croft s.n. [San Diego, 1885] is V. quadrangulata Heller, Pringle 4180 and Schaffner s.n. [San Luis Potosí, 1875-79] are V. teucrifolia Mart. & Gal., and Semple & Love 321 and Van Devender & Van Devender s.n. [23 March 1976] are V. wrightii A. Gray. Meebold 27286 is a mixture of V. bipinnatifida Nutt. and Evolvulus sp.

Additional citations: ARIZONA: Cochise Co.: Tilforth 562 (Mi, Sd--90751). Pima Co.: J. A. Churchill s.n. [29 March 1972] (Ln--235661). Pinal Co.: Thorner s.n. [May 28, 1905] (Ld). MEXICO: Chihuahua: Henrickson 5723 (Ld), 8027 (Ld), 11212 (Ld); Johnston, Wendt, & Chiang C. 10540a (Ld), 11307e (Ld); Stuessy 965 (Ws). Coahuila: Chiang C., Wendt, & Johnston 7738 (Ld); Henrickson 5950b (Ld); Johnston, Wendt, Chiang C., & Riskind 11985m (Ld). Nuevo León: Chiang C., Wendt, & Johnston 7987 (Ld). Michoacán: Torke, LeDoux, & Ellis 302 (N). Puebla: Ventura A. 1646 (Sd--78371). San Luis Potosí: Schaffner s.n. [San Luis Potosí, 1875-79] (Mu--1561). Veracruz: Kerber 255 (Mi, Mu--1777). Zacatecas: Chiang C., Wendt, & Johnston 7887 (Ld), 7900 (Ld); Davidse 9944 (Ld); Henrickson 6345c (Ld), 6667 (Ld), 13293 (Ld); Johnston, Chiang C., & Wendt 10432 (Ld); Johnston, Wendt, & Chiang C. 11566a (Ld). State undetermined: W. Schumann 1071 [Feral] (Mu--3892).

VERBENA CILIATA var. LONGIDENTATA Perry

Additional bibliography: G. W. Thomas, Tex Pl. Ecol. Summ. 78. 1969; Moldenke, Phytologia 28: 204--205 (1974) and 34: 252 & 270. 1976.

Ruryon reports this plant "very abundant in this region [Cameron County, Texas], covers acres of ground and is widespread in open fields, sandy soil" and describes it as an "erect branching and spreading herb". The corollas are said by him to have been "blue-purple" on R. Ruryon 1782, a collection which has been mis-

identified and erroneously cited previously by me as V. ambrosifolia f. eglandulosa Perry.

The corollas are described as "lavender-blue" on Henrickson 7630 and "light magenta and purple" on Henrickson 6239. Recent collectors in Mexico have found the plant growing in rock and gravel in xerophytic canyons, in low clay roadside ditches, and on steep limestone-shale southwest-facing slopes, growing in association with Agave, Baccharis, Coryza, Flourensia, Fouquieria, Larrea, Parthenium, Pectis, Tidestromia, Yucca, cacti, grasses, etc., at altitudes of 4500--6100 feet. Henrickson refers to it as an "infrequent annual".

Material of this variety has been misidentified and distributed in some herbaria as V. erinoides Lam. or V. multifida Ruiz & Pav. The Ramirez & Cardenas 13, cited previously and again below, is a mixture with V. ambrosifolia Rydb.

Additional & emended citations: TEXAS: Cameron Co.: R. Ruryon 1782 (Mu, Rr, Rr). Zavala Co.: Ramirez & Cardenas 13, in part (Au--245214). MEXICO: Chihuahua: Henrickson 7630 (Ld). Nuevo Leon: Painter, Lucas, & Barkley 14290 (Ld). Zacatecas: Henrickson 6239 (Ld). CULTIVATED: France: Weinkauff s.n. [Jard. des plant. 1834] (Mu--1254). Germany: Berger s.n. (Mu--310); Herb. Schwaegerichen s.n. [Hort. Lipsiensis] (Mu--1252, Mu--1253); Herb. Zuccarini s.n. (Mu--311, Mu--312).

VERBENA CILIATA var. PUBERA (Greene) Perry

Additional bibliography: G. W. Thomas, Tex. Pl. Ecolog. Summ. 78. 1969; Moldenke, Phytologia 30: 139. 1975.

The Meebold 22491, distributed as V. ciliata var. pubera, is actually V. wrightii A. Gray.

Additional citations: NEW MEXICO: G. L. Fisher s.n. [Nara Visa, Apr. 21, 1911] (Mu--4247). ARIZONA: Mohave Co.: J. A. Churchill s.n. [24 April 1953] (Ln--203425).

VERBENA CLAVATA Ruiz & Pav.

Additional bibliography: Buek, Gen. Spec. Syn. Candoll. 3: 494. 1858; Moldenke, Phytologia 28: 205. 1974; Soukup, Biota 11: 18. 1976.

The Princess Therese of Bavaria 281, distributed as V. clavata, actually is V. occulta Moldenke.

Additional citations: MOUNTED ILLUSTRATIONS: Ruiz & Pav., Fl. Peruv. & Chil. 1: pl. 33, fig. b. 1797 (N, Z).

VERBENA CLAVATA f. ALBIFLORA Moldenke

Additional bibliography: Moldenke, Phytologia 23: 191. 1972; Soukup, Biota 11: 18. 1976.

VERBENA CLAVATA var. CASMENSIS Moldenke

Additional bibliography: Moldenke, Phytologia 23: 191. 1972;

Soukup, Biota 11: 18. 1976.

xVERBENA CLEMENSORUM Moldenke

Additional bibliography: Moldenke, Phytologia 23: 192 & 435. 1972.

VERBENA CLOVERAE Moldenke

Additional & emended bibliography: G. W. Thomas, Tex. Pl. Ecology. Summ. 78. 1969; Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl., imp. 1, 716 (1969) and imp. 2, 716. 1974; Moldenke, Phytologia 30: 139. 1975.

Thomas (1969) calls this the "Clover verbena".

xVERBENA COPRUPA Moldenke

Additional bibliography: Moldenke, Phytologia 30: 139--140 (1975) and 31: 411. 1975.

VERBENA CORYMBOSA Ruiz & Pav.

Additional bibliography: Buek, Gen. Spec. Syn. Candoll. 3: 494. 1858; Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl., imp. 1, 716 (1969) and imp. 2, 716. 1974; Kooiman, Act. Bot. Neerl. 24: 463. 1975; Moldenke, Phytologia 30: 140 (1975) and 34: 260. 1976; Soukup, Biota 11: 18. 1976.

Hollermayer describes this plant as 1 meter or more tall. The corollas are said to have been "blue" on Hollermayer 62, while Lindeman says "corola roxa 2P7/6" and encountered the plant in a "pequeño bafñado".

Additional citations: BRAZIL: Rio Grande do Sul: Lindeman ICN. 9448 (Ut--320455). Santa Catarina: Lourteig 2164 (N). CHILE: Bío-Bío: Neger s.n. [S. Juan, 1895-97] (Mu--2980). Concepción: Merrxmüller 24819 (Mu). Valdivia: Buchtien s.n. [Valdivia, 19/2/1904] (Mu--3995); Hollermayer 62 (Mu). Laja Island: Poeppig III. 157 (Mu--305). MOUNTED ILLUSTRATIONS: Ruiz & Pav., Fl. Peruv. & Chil. 1: pl. 33, fig. a. 1797 (N, Z).

VERBENA CRITHMIFOLIA Gill. & Hook.

Additional & emended synonymy: Verbena critmifolia Gill. & Hook. ex Moldenke, Lilloa 8: 429, in nota. 1942; Phytologia 9: 46, in syn. 1963. Verbena critmifolia Gill. ex Moldenke, Résumé Suppl. 3: 37, in syn. 1962.

Additional & emended bibliography: Baxt. in Loud., Hort. Brit. Suppl. [3]: 655. 1850; Buek, Gen. Spec. Syn. Candoll. 3: 494 & 507. 1858; Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl., imp. 1, 715 & 716 (1969) and imp. 2, 715 & 716. 1974; Moldenke, Phytologia 30: 140. 1975.

The Lossen 8, distributed as V. crithmifolia, actually is V. hookeriana (Covas & Schnack) Moldenke.

Additional citations: ARGENTINA: La Pampa: Krapovickas, Cris-tóbal, Mroginski, & Fernandez 22321 (N). Neuquen: Ammann 115 (Mu).

VERBENA CUMINGII Moldenke

Additional bibliography: Moldenke, *Phytologia* 30: 133 & 140. 1975.

VERBENA CUNEIFOLIA Ruiz & Pav.

Additional bibliography: Buek, *Gen. Spec. Syn. Candoll.* 3: 494. 1858; Moldenke, *Phytologia* 28: 348--349. 1974; Soukup, *Biota* 11: 18. 1976.

The corollas on Infantes 5295 are described as having been "moradas" [purple] and this collector encountered the plant in flower in February. Ferreyra describes it as a subshrub, 40--80 cm. tall, and found it growing in puna and pajonal associations, at 3900--4000 meters altitude, flowering and fruiting in May. López-Palacios describes it as an "hierba rastrera, hojas de 1--1.5 cm, flores morado claro, pequeñas, espigas delgadas" and encountered it at 2500 meters altitude.

Additional citations: ECUADOR: Loja: López-Palacios 4162 (Z). PERU: Ancash: R. Ferreyra 14393 (W--2740336). La Libertad: Infantes 5295 (Mu).

xVERBENA DEAMII Moldenke

Additional bibliography: Perkins, Estes, & Thorp, *Bull. Torrey Bot. Club* 102: 194, 195, & 197. 1975; Moldenke, *Phytologia* 30: 140 (1975) and 34: 250. 1976.

Perkins and his associates (1975) found a single plant of this hybrid in a mixed population of verbenas including both parents, which, when artificially pollinated with V. bracteata pollen, produced a plant with 133 potential seeds and a 17.3 percentage of actual seed-set -- V. bracteata, one parent, had 66.5 percent seed-set and V. stricta, the other parent, had 76.3--87.6 percent seed-set. The only insect observed visiting indiscriminately both parental plants and their hybrid was Systropus sp. (observed with actual Verbena pollen on the head).

Additional citations: MISSOURI: County undetermined: Martens s.n. [Missouri] (Mu--292).

VERBENA DELICATULA Mart.

Additional bibliography: Buek, *Gen. Spec. Syn. Candoll.* 3: 494. 1858; Moldenke, *Phytologia* 23: 106. 1972.

VERBENA DELTICOLA Small

Additional & emended bibliography: G. W. Thomas, *Tex. Fl. Ecolog. Summ.* 78. 1969; Bolkh., Grif, Matvej., & Zakhar., *Chrom. Numb. Flow. Pl., imp. 1*, 716 (1969) and *imp. 2*, 716. 1974; Moldenke, *Phytologia* 28: 349 (1974) and 34: 251. 1976.

Additional citations: TEXAS: Cameron Co.: C. L. Lundell 10758 (N). Nueces Co.: Duncan s.n. [March 16, 1975] (Ac). MEXICO: Nuevo León: F. A. Barkley 14361 (Ld).

VERBENA DEMISSA Moldenke

Additional bibliography: Moldenke, *Phytologia* 23: 222 & 233 (1972), 34: 257 (1976), and 36: 33 & 51. 1977.

This plant has been found in flower and fruit in March (in addition to the months previously recorded by me). Material has been misidentified and distributed in some herbaria as V. carolina var. polystachya (H.B.K.) Schimpff.

Additional citations: ECUADOR: Chimborazo: Schimpff 765 (Mu).

VERBENA DEMISSA f. ALBA Moldenke, *Phytologia* 36: 51. 1977.

Bibliography: Moldenke, *Phytologia* 36: 33 & 51. 1977.

Citations: ECUADOR: Pichincha: López-Palacios 4200 (Z--type).

xVERBENA DERMENI Moldenke

Additional synonymy: Verbena dermani Mold. ex Soukup, *Biota* 11: 18. 1976.

Additional bibliography: Moldenke, *Phytologia* 30: 140 (1975) and 31: 384. 1975; Soukup, *Biota* 11: 18. 1976.

Material of this hybrid has been misidentified and distributed in some herbaria as V. litoralis H.B.K. On the other hand, the Pedersen 9867, distributed as this hybrid, seems to be typical V. hispida Ruiz & Pav.

Additional citations: PERU: Junín: W. Hoffmann 182 (Mu). BOLIVIA: La Paz: O. Buchtien 185 (Mu).

VERBENA DISSECTA Willd.

Additional synonymy: Verbena dissecta Willd. ex Soukup, *Biota* 11: 18. 1976. Glandularia dissecta (Willd.) Schnack & Covas ex Soukup, *Biota* 11: 18, in syn. 1976.

Additional & emended bibliography: Buek, *Gen. Spec. Syn. Candoll.* 3: 494. 1858; Bolkh., Grif, Matvej., & Zakhar., *Chrom. Numb. Flow. Pl.*, imp. 1, 715 & 716 (1969) and imp. 2, 715 & 716. 1974; Moldenke, *Phytologia* 28: 349. 1974; Troncoso, *Darwiniana* 18: 318 & 409. 1974; López-Palacios, *Revist. Fac. Farm. Univ. Los Andes* 15: 94. 1975; Soukup, *Biota* 11: 18. 1976; Moldenke, *Phytologia* 36: 42 & 47. 1977.

The corollas on Cabrera & al. 17128 are said to have been "lilac" when fresh.

The Dessauer s.n. and Frömbing s.n. [Chili 1886], distributed as V. dissecta, actually are V. berterii (Meisn.) Schau., while Araujo 1256 [Herb. FEEMA 12264] is V. tenera Spreng.

Additional citations: ARGENTINA: Buenos Aires: Cabrera, Fabris, Torres, & Tur 17128 (Mu). Santiago del Estero: Pierotti "h" [1-IV-944] (Ut-330536B), "h" [6-4-44] (Ut-330564B).

VERBENA DOMINGENSIS Urb.

Additional bibliography: León & Alain, *Fl. Cuba*, imp. 2, 2: 281. 1974; Moldenke, *Phytologia* 30: 140, 159, & 169 (1975) and 34: 19-20 & 254. 1976.

The corollas on Liogier & Liogier 19489 are said to have been "dark-purple" when fresh.

Material of V. domingensis has been distributed in some herbaria as "Labiata sp." and as "Labiatae sp. Subaphylla". On the other hand, the Liogier 16846, distributed as typical V. domingensis, actually is the type collection of f. foliosa Moldenke, while Curtiss 677 and Rugel 212 [856] and perhaps most or all the other Cuban material cited by me in previous installments of these notes are V. officinalis L. [or, perhaps more likely, V. halei Small].

Additional citations: HISPANIOLA: Dominican Republic: Eggers 1828 (Mu--4108), 2175 (Mu--3902); Liogier & Liogier 19489 (N).

VERBENA DOMINGENSIS f. FOLIOSA Moldenke, *Phytologia* 34: 19--20. 1976.

Bibliography: Moldenke, *Phytologia* 34: 19--20 & 254. 1976.

Citations: HISPANIOLA: Dominican Republic: Liogier 16846 (N--type).

VERBENA EHREBERGIANA Schau.

Additional & emended bibliography: Buek, *Gen. Spec. Syn. Candoll.* 3: 494. 1858; Bolkh., Grif, Matvej., & Zakhar., *Chrom. Numb. Flow. Pl.*, imp. 1, 716 (1969) and imp. 2, 716. 1974; Moldenke, *Phytologia* 28: 207 (1974) and 34: 251 & 252. 1976.

Mears reports finding this species growing in association with Fuchsia, Reseda, Stillingia, Cheilanthes, and Cornus.

Material of V. ehrenbergiana has been misidentified and distributed in some herbaria as V. officinalis L. On the other hand, the Stalmach 198, previously cited by me as V. ehrenbergiana, seems, on re-examination, to be V. carolina L., thus nullifying the only "record" of V. ehrenbergiana from outside of Mexico.

Additional citations: MEXICO: Hidalgo: Mears 299b (Ln--222097); Moore & Wood 3962 (Mi). Nuevo León: Pringle 1948 (Mu--3893). Tamaulipas: Richardson 188 (Ld). State undetermined: Karwinski s.n. [Taloman, July 1827] (Mu--307, Mu--308, Mu--346), s.n. [in imperio mexicano] (Mu--419).

VERBENA ELEGANS H.B.K.

Additional synonymy: Verbena moranensis H.B.K. apud Buek, *Gen. Spec. Syn. Candoll.* 3: 495, in syn. 1858.

Additional bibliography: G. Don in Loud., *Hort. Brit.*, ed. 1, 247 (1830), ed. 2, 247 (1832), and ed. 3, 247. 1839; Buek, *Gen. Spec. Syn. Candoll.* 3: 494 & 495. 1858; G. W. Thomas, *Tex. Pl. Ecolog. Summ.* 78. 1969; Bolkh., Grif, Matvej., & Zakhar., *Chrom. Numb. Flow. Pl.*, imp. 1, 716 (1969) and imp. 2, 716. 1974; El-Gazzar, *Egypt. Journ. Bot.* 17: 75 & 78. 1974; Moldenke, *Phytologia* 28: 349, 451, & 457. 1974; Kooiman, *Act. Bot. Neerl.* 24: 464. 1975; Moldenke, *Phytologia* 30: 134 (1975) and 31: 378. 1975.

Recent collectors have encountered this plant on bare hills and

in hillside oak forests, on northeast-facing slopes, in calcareous loam in areas of matorral-chaparral-encinar on slopes of alluvial fans, growing in association with Agave lecheguilla, Parthenium incanum, Opuntia leptocaulis, Hesperaloe, and Cercocarpus, at 550 meters altitude, flowering in May.

Don (1830) calls this species the "elegant vervain" and dates its introduction into English gardens from Mexico as 1826. Mears reports finding it growing with Cornus, Drymaria, Dudleya, Lobelia, Maurandya, Heuchera, Piqueria, and Reseda in Hidalgo. Hendricks reports it growing "from a stout shallow caudex" and "not common" at 8000 feet altitude, and on his no. 439 the corollas are said to have been "lavender, one petal notched and larger".

The Sydow s.n. [Sept. 1900], distributed as typical V. elegans, actually represents var. asperata Perry.

Additional citations: MEXICO: Coahuila: Johnston, Wendt, & Chiang C. 10161b (Ld); Keil, Meyer, Lewis, & Pinkava 6037 (Ld, Te-68562). Durango: Hendricks 439 (Ws). Hidalgo: Mears 307c (Mu); Pringle 6908 (Ln--70156, Mu--3732), 7591 (Mu--4165); Troll 448 (Mu). Sonora: Reeves & Lehto L.18689 (Te--75344). State undetermined: Karwinski s.n. [in imperio mexicano] (Mu--266, Mu--267).

VERBENA ELEGANS H.B.K. x V. PERUVIANA (L.) Britton

Additional bibliography: Moldenke, Phytologia 28: 203 & 457. 1974.

VERBENA ELEGANS H.B.K. x V. PULCHELLA Sweet

Additional bibliography: Moldenke, Phytologia 28: 208 & 457. 1974.

VERBENA ELEGANS H.B.K. x V. STELLARIOIDES Cham.

Additional bibliography: Moldenke, Phytologia 28: 208 & 457. 1974.

VERBENA ELEGANS var. ASPERATA Perry

Additional bibliography: G. W. Thomas, Tex. Pl. Ecol. Summ. 78. 1969; Moldenke, Phytologia 30: 134 & 140--141 (1975) and 31: 378. 1975.

Hendricks encountered this plant in wet mountain meadows.

Additional citations: MEXICO: Durango: Hendricks 538 (Ws). San Luis Potosí: Sanderson 262 (Ln--238191). Tamaulipas: Urbatsch 2423 (Ld). CULTIVATED: Germany: Herb. Schönau s.n. (Mu). Sweden: Sydow s.n. [Sept. 1900] (Ac).

xVERBENA ENGELMANNII Moldenke

Additional bibliography: Greller, Bull. Torrey Bot. Club 102: 416. 1975; R. A. Davidson, State Univ. Iowa Stud. Nat. Hist. 20 (a): 77. 1959; Moldenke, Phytologia 30: 141 & 174 (1975), 31: 377 (1975), 34: 247 & 248 (1976), and 36: 29. 1977.

The Wheeler collection cited below exhibits some fasciated in-

florescences. Greller (1975) reports the hybrid from Suffolk County, New York, while Davidson (1959) found it in Louisa and Van Buren Counties, Iowa.

Additional citations: ILLINOIS: Cass Co.: Geyer s.n. [Beardstown, July 1842] (Mu--363--isotype). Winnebago Co.: M. S. Ebb s.n. [Fountaindale] (Mu--4250). MICHIGAN: Ingham Co.: C. F. Wheeler s.n. [Aug. 30, 1890] (Ln--142449).

VERBENA EPHEROIDES Cham.

Additional bibliography: Buek, Gen. Spec. Syn. Candoll. 3: 494. 1958; Moldenke, Phytologia 30: 141. 1975.

The Lorentz 131, distributed as V. ephedroides, is actually V. brasiliensis Vell.

VERBENA FASCICULATA Benth.

Additional bibliography: Moldenke, Phytologia 23: 230--231 (1972) and 24: 46. 1972; Soukup, Biota 11: 18 & 19. 1976; Moldenke, Phytologia 36: 33. 1977.

Additional citations: PERU: Ica: Ellenberg 4914 (Ac).

VERBENA FERREYRAE Moldenke

Additional bibliography: Moldenke, Phytologia 23: 231. 1972; Soukup, Biota 11: 18. 1976.

VERBENA FILICAULIS Schau.

Additional bibliography: Buek, Gen. Spec. Syn. Candoll. 3: 494 & 495. 1958; Moldenke, Phytologia 30: 141. 1975.

Additional citations: BRAZIL: Minas Gerais: Widgren s.n. [1845] (Mu--1566). Paraná: Dusén 15679 (Mu). São Paulo: F. C. Hoehne 443 (Mu--4317).

VERBENA FLAVA Gill. & Hook.

Additional & emended bibliography: Schau. in A. DC., Prodr. 11: 555--556. 1847; Buek, Gen. Spec. Syn. Candoll. 3: 494. 1858; Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl., imp. 1, 715 & 717 (1969) and imp. 2, 715 & 717. 1974; Moldenke, Phytologia 30: 141. 1975.

Additional citations: ARGENTINA: Mendoza: Ruiz Leal 8503 (Ld, Ut--330570B). Neuquen: Ammann 113 (Mu, Mu); Schajovskoy 137 (Mu), 138 (Mu).

VERBENA GALAPAGOSENSIS Moldenke

Additional bibliography: Moldenke, Phytologia 23: 232. 1972; Balgooy, Pacif. Pl. Areas 3: 245. 1975.

López-Palacios describes this plant as "hierba de 70 cm. a 1 m., hojas superiores relativamente estrechas, fl. morado claro" and found it in flower and fruit in February.

Van der Werff's collection, cited below, is placed here tentatively, awaiting his publication on the Galápagos verbenas. He says of it that "The plant was shrubby, with ascending stems to 2 m. long; leaves small, only at [the] base of stems are there dis-

tinctly larger leaves". He found it growing "at crater rim in a dry area in no way comparable to the wet fern-sedge zones that are found on the summits of" Chatham and Indefatigable Islands.

Additional citations: GALÁPAGOS ISLANDS: Albemarle: López-Palacios 4298 (Z); Van der Werff 1580 (Z).

VERBENA GENTRYI Moldenke

Additional bibliography: Moldenke, *Phytologia* 23: 232 (1972) and 34: 252. 1976.

Henrickson has collected what appears to be this species at 7600 feet altitude, where he found it to be frequent in shaded woods in association with Carex, Bidens, Eryngium, composites, pines, oaks, etc., in an area of open pine-juniper woodland-meadow, flowering and fruiting in September.

Additional citations: MEXICO: Chihuahua: Henrickson 8035 (Ld).

VERBENA GLABRATA H.B.K.

Additional bibliography: Buek, *Gen. Spec. Syn. Candoll.* 3: 494. 1858; Balgooy, *Pacif. Pl. Areas* 3: 245. 1975; López-Palacios, *Revist. Fac. Farm. Univ. Los Andes* 15: 92. 1975; Moldenke, *Phytologia* 30: 141. 1975; Soukup, *Biota* 11: 18. 1976.

In addition to the months previously reported by me, this species has been collected in fruit in March. Recent collectors have encountered it on valley floors and in volcanic sand and tufa on basalt rock at 11,600 feet altitude. López-Palacios & Idrobo describe the plant as "Hierba acumbente, de 1-60 cm. Espigas densas. Coronadas de flores lila intenso" or "lila claro" and as "hierba rastrera", the corollas "morado claro" or "morado muy claro", found it growing at 2450-3200 meters altitude, and record the vernacular name, "verbena blanca". The corollas are said to have been "purple" on Saunders 363.

Additional citations: COLOMBIA: Cauca: López-Palacios & Idrobo 3724 (Ac, N). Nariffo: López-Palacios & Idrobo 3769 (Ld, N). EC-UADOR: Cotopaxi: Collector undetermined VIII (Mu-1106), XIV (Mu-1107). Imbabura: López-Palacios 4064 (Ld). Pichincha: Herb. Univ. Cent. Quito 2341 (Mu), 2342 (Mu), 2344 (Mu); López-Palacios 4206 (Ld), 4227 (Ld). PERU: Lima: S. G. E. Saunders 363 (Ld).

VERBENA GLABRATA var. TENUISPICATA Moldenke

Additional bibliography: Moldenke, *Phytologia* 23: 233. 1972; Balgooy, *Pacif. Pl. Areas* 3: 245. 1975.

Van der Werff comments that "This is the Verbena from the wet fern-sedge zone on Cerro Azul. The stems are crawling-ascending and the plants no more than 50 cm. tall."

Additional citations: GALÁPAGOS ISLANDS: Albemarle: Van der Werff 2286 [1586] (Z).

VERBENA GLANDULIFERA Moldenke

Additional bibliography: Moldenke, *Phytologia* 30: 141. 1975.

The corollas are said to have been "violet" in color on Lossen

72 when fresh.

Additional citations: ARGENTINA: Córdoba: Lossen 72 (Mu--4371).

VERBENA GLUTINOSA Kuntze

Additional bibliography: Moldenke, Phytologia 30: 141. 1975.

Additional citations: ARGENTINA: Neuquen: Ammann 111 (Mu), 112 (Mu).

VERBENA GOODINGII Briq.

Additional synonymy: Verbena ciliata var. alba Palmer ex Moldenke, Phytologia 34: 278, in syn. 1976.

Additional bibliography: G. W. Thomas, Tex. Pl. Ecolog. Summ. 78. 1969; Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl., imp. 1, 715 & 717 (1969) and imp. 2, 715 & 717. 1974; R. D. Gibbs, Chemotax. Flow. Pl. 3: 1753--1755 (1974) and 4: 2295. 1974; E. H. Jordan, Checklist Organ Pipe Cact. Natl. Mon. 7. 1975; Moldenke, Phytologia 30: 141--142 & 179 (1975), 31: 415 (1975), and 34: 278. 1976.

Recent collectors have encountered this species in the juniper vegetational zone, in sandy soil in the juniper-pinyon-oak association, in a limestone canyon with scattered juniper and mixed shrubs, in rocky soil, on desert slopes, and by a permanent stream in grazed oak-Sonoran zone. Moran reports it "common on burns". Mrs. Jordan (1975) calls it the "Goodding vervain", while Thomas (1979) calls it the "Goodding verbena".

Palmer's V. ciliata var. alba seems to be based on Ed. Palmer 339 from the Mohave Desert of southern California.

Gibbs (1974) reports that the Ehrlich test gave positive results (bright blue-green) in the leaves of this species, but that cyanogenesis and leucoanthocyanin are absent from the leaves and syringin is absent from the stems.

Additional citations: NEVADA: Clark Co.: Purpus 6061 (Mu--4285). ARIZONA: Gila Co.: Higgins 8790 (N). Mohave Co.: Atwood 6026 (N); J. A. Churchill s.n. [18 April 1953] (Ln--204267); M. E. Jones s.n. [Hackberry, May 24, 1884] (Ln--70252); Reeves & Pinkava 11947 (N, W--2737221). Pima Co.: L. M. Andrews 259 (N); Lehto, Brown, Nash, & Pinkava 10646 (W--2736615); Warren & Turner 68-87 (Ld). Pinal Co.: Mrs. R. S. Baker s.n. [Oracle, Spring 1901] (Ln--120073); Meebold 15588 (Mu); Moroz s.n. [Schallert 22814] (Mu). Santa Cruz Co.: Reeves R.1166 (N). CALIFORNIA: San Bernardino Co.: D. Howe s.n. [24 April 1968] (Sd--70017); Edw. Palmer 339 (Mu--1563). MEXICO: Baja California: R. V. Moran 17739 (Sd--75136).

VERBENA GOODINGII var. NEPETIFOLIA Tidestr.

Additional bibliography: Moldenke, Phytologia 28: 350 (1974) and 31: 415. 1975.

Moran found this plant to be "fairly common" at 300 meters altitude in Baja California; also "occasional" and "locally common in disturbed areas", "occasional in arroyo beds", "occasional in dis-

turbed roadside soil", and on south-facing talus slopes in that state. Other collectors have found it in short-tree forests and growing in association with Washingtonia filifera.

The corollas are described as having been "lavender" on R. V. Moran 16405, 20047, 21750, & 22099, "pale-lavender" on R. V. Moran 20638 & 21883, and "pink" on Spellenberg & Spellenberg 3062.

The Spellenberg & Spellenberg 3062, cited below, was previously incorrectly listed by me as V. ambrosifolia Rydb. These two collectors describe the plants as growing in "clumps with many stems".

Additional citations: ARIZONA: Cochise Co.: Spellenberg & Spellenberg 3062 (N). Pima Co.: Fugate, McLaughlin, & McManus 652 (Ld); Warren & Turner 68-33 (Sd--78500). Yuma Co.: Phillips, Phillips, Goldberg, Fugate, & McManus 647 (Ld). MEXICO: Baja California: R. V. Moran 16405 (Sd--75481), 20047 (Sd--92459), 20638 (Sd--38939), 21750 (Sd--91255), 21883 (Sd--91260), 22099 (Sd--19477); Moran, Witham, & Hommersand 16541 (Sd--71562). Sonora: Arguelles 73 (Ld, Ld).

xVERBENA GOODMANI Moldenke

Additional synonymy: Verbena stricta x halei Perkins, Estes, & Thorp, Bull. Torrey Bot. Club 102: 194, in syn. 1975.

Additional bibliography: Moldenke, Phytologia 23: 237 & 436. 1972; Perkins, Estes, & Thorp, Bull. Torrey Bot. Club 102: 194, 195, & 197. 1975; Moldenke, Phytologia 34: 279. 1976.

Perkins and his associates (1975) found one plant of this hybrid among a mixed population of verbenas including both parents, which, when artificially cross-pollinated with V. halei pollen produced 149 potential seeds or a 26.8 percent seed-set, whereas 12 insect-visited V. halei plants produced 468 seeds (a 68 percent seed-set) and insect-visited V. stricta plants produced a 76.3--87.6 percent seed-set. They tell us that xV. goodmani and xV. illicita Moldenke are the two most common naturally occurring hybrids in a mixed population of the parental species; 10 plants of the former and 20 of the latter were found in the area tested.

VERBENA GRACILESCENS (Cham.) Herter

Additional & emended bibliography: Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl., imp. 1, 717 (1969) and imp. 2, 717. 1974; López-Palacios, Revist. Fac. Farm. Univ. Los Andes 15: 92. 1975; Moldenke, Phytologia 30: 142 & 159. 1975.

Recent collectors have found this plant in fruit in November. The corollas are said to have been "violet" in color when fresh on Krapovickas & al. 26687 and "white" on Schinini & Cristóbal 9865. Lindeman and his associates encountered it in a "beira do rio inundada periodicamente, solo argilo duro" and describe the corolla color as "azul 10PB6/8".

Additional citations: BRAZIL: Rio Grande do Sul: Lindeman, Ir-

gang, & Valls ICN.8423 (Ut--320458). PARAGUAY: Fiebrig 4432 (Mu). URUGUAY: Herter 1058 [Herb. Herter 82656] (Mu). ARGENTINA: Córdoba: Lorentz 113 (Mu--1572). Corrientes: Cabrera 11784 (Mu); Schinini & Cristóbal 9865 (Ld). Jujuy: Krapovickas, Schinini, & Quarín 26687 (Ld). Salta: Schreiter 11466 (Ld). Santiago del Estero: Lullo 4 (Ut--330562B).

VERBENA GRACILIS Desf.

Additional bibliography: Buek, Gen. Spec. Syn. Candoll. 3: 494 & 495. 1858; Hinton & Rzedowski, Anal. Esc. Nac. Cienc. Biol. 21: 111. 1975; A. L. Moldenke, Phytologia 31: 415. 1975; Moldenke, Phytologia 30: 142 (1975) and 34: 270. 1976.

Henrickson encountered this plant in clay soil of pasture land, growing with Agave, Buddleia, Ephedra, Mimosa, Opuntia, Yucca, etc., while Hendricks found it in "weedy yards" and in "sandy barren areas dominated by mesquite and Acacia".

The W. Schumann 1070 collection, cited below, is a mixture with V. canescens H.B.K., while Hendricks 332 is a mixture with a composite. The Cabrera 11784 and Herter 1058 [Herb. Herter 82656], distributed as V. gracilis, actually are V. gracilescens (Cham.) Herter, while J. A. Churchill s.n. [7 April 1972] is V. neomexicana (A. Gray) Small.

Additional citations: MEXICO: Durango: Hendricks 332, in part (Ws), 450 (Ws). Federal District: Pringle 6539 (Mu--1829). Jalisco: W. Schumann 1070, in part (Mu--3891). San Luis Potosí: Henrickson B.6381 (Ld); Schaffner s.n. [1875-79] (Mu--1559). CULTIVATED: Germany: Herb. Kummer s.n. [Hort. bot. Monac.] (Mu--1245); Herb. Zuccarini s.n. [Hort. bot. Monac. 1835] (Mu--296).

VERBENA GRISEA Robinson & Greenm.

Additional bibliography: Moldenke, Phytologia 23: 239. 1972; Balgooy, Pacif. Pl. Areas 3: 245. 1975.

VERBENA GYNOBASIS Wedd.

Additional bibliography: Moldenke, Phytologia 23: 240. 1972; Soukup, Biota 11: 18. 1976.

The Troll collection, cited below, in the Berlin herbarium bears a label indicating that it was collected in Bolivia, while in the Munich herbarium it is inscribed "Chile". It is not certain which locality is correct, but Bolivia is the more likely.

Additional citations: BOLIVIA: Santa Cruz: Troll 3312 (Mu).

VERBENA GYNOBASIS var. STRIGOSA Wedd.

Additional bibliography: Moldenke, Phytologia 23: 240. 1972; Soukup, Biota 11: 18. 1976.

[to be continued]